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A JOURNAL DEVOTED TO THE STUDY OF THE NATIVE PEOPLES OF AUSTRALIA, NEW GUINEA AND THE ISLANDS OF THE PACIFIC OCEAN

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DESCENT IN TANGU

By KENELM O. L. BURRIDGE

TANGU[1] are a hunting, gathering, and gardening people whose numerous settlements are located on high ground some fifteen miles inland from Bogia Bay on the north coast of New Guinea in the Madang District. The population, some two thousand souls, is grouped into four neighbourhoods, Wanitzir, Biampitzir, Mangigumitzir, and Riekitzir. Each of these neighbourhoods may be distinguished from the others by various criteria, but when taken together they have sufficient in common to form a unity distinct as a whole from neighbouring peoples. Some fifty or sixty years ago settlements were much larger and fewer in number, and the structure of social relationships differed in many respects from that existing today. In particular, a unit known as the *gagai* (pl. *gagawa*)[2] was the jural group. The composition and criteria of recruitment to *gagawa* differed in various parts of Tangu, but was everywhere dependent upon residential connexions, kin affiliation, and explicit choice. In Mangigumitzir, Biampitzir, and Riekitzir the kin component appears to have been mainly matrilineal, and in Wanitzir it appears to have been mainly patrilineal with some evidence to show double unilineal forms of recruitment. Nevertheless, *gagawa* appear to have been sufficiently stable and compact to give descent as a category of recruitment to a jural group by kin affiliation a reasonably constant value in particular parts of Tangu.

Partly owing to a series of historical events—an epidemic sickness followed by internecine fighting and local migrations—but also due to the element of choice in *gagai* membership, recruitment dependent upon particularised and exclusive categories of kin affiliation became less and less important until, currently, the *gagai* itself has ceased to be of significance in relation to the social, economic, and political activities engaged by Tangu. Today, though the memory of *gagawa* still bears upon mental

[1] Though complete in itself this essay follows on from one that has already appeared in this journal: "The Gagai in Tangu", *Oceania*, Vol. XXVII. Short title for reference: GT.

[2] For detail *vide* GT, pp. 64 *sqq.*

activities, the basic and most permanent co-operative and social unit is the household consisting of a married couple and their children, natural or adopted, together with, perhaps, an aged parent of either spouse. Tangu are polygynous, and a man with two or more wives is the pivot of parti-households built round each wife and her children who may reside in one dwelling or in separate contiguous dwellings: the whole composes, for most purposes, a single conjoint or composite household. Kin affiliation under the criteria of *mwerz ungunwan*[3] (one womb, connoting usually those of the same sex and generation who have a common grandmother traced through her own daughters), *ringertiam* (untranslatable, but usually connoting those of different sex and the same generation born of the same pair of parents), and *riena 'gunwan* (one blood, for a male—father's brother's daughters and mother's sister's daughters) are by no means irrelevant to the way households combine together economically and politically, but personal preference, economic advantage, and political expediency are the important determinative criteria. Combinations are not permanent, households shift their allegiances. Influential and powerful men create alliances which only persist so long as they themselves can make good their claims to leadership by showing ability to produce foodstuffs combined with political acumen in competition with others. Often, though the rivalry between influential men is subject to the overriding moral value of equivalence—frequently expressed in feasts and exchanges and implying an overall abhorrence of dominance, either moral, political, or economic—these and other factors lead to local migrations. Settlements become larger or fragment, and new settlements are founded. Kin affiliations persist, but group action by persons standing to each other in particularised categories of genealogical relationship is neither general, nor, when it happens to occur, is it either permanent or exclusive or, foreseeably, expected to occur again. In no part of Tangu is descent the familiar formal constant. Its value as a sociological category is variable and depends upon a variety of claims made good in certain contexts.

2.

A woman who is pregnant either goes to her mother for the birth, or, as is more often the case, tries to have her mother with her when her time is due. In any case, sisters come to witness the birth and help in the labour and parturition; and one, or perhaps two, will remain with her for varying periods to suckle the child and help with the household chores. A mother is responsible for her child, nourishes, and cares for it. The strongest public evidence of motherhood is suckling the child; further, the notion of motherhood is contained in the suckling rather than in the carrying, labour, and issue. If a mother has insufficient milk in her breasts her sister will suckle the child for her, and even if she is amply endowed her sisters will also suckle the child as she, indeed, will give of her own to theirs. For about two or three weeks after a birth the father keeps his distance. Most men prefer not to sleep in the same hut as the newly born child, and when fathers first handle their children

[3] For the detail on this and the following two terms see GT, pp. 61 *sqq*.

they do so gingerly, holding it awkwardly at a distance, with the mother close by, lest the child should bring misfortune upon them by micturating. The mother's brothers come to see the child, bringing small gifts for the family, and coconuts for planting. They handle the child and fondle it, much as the father does, whether it is a son or a daughter.

By the time a child is four years of age he or she knows the mother's sisters intimately; there has been no hesitation in seeking their breasts either to fondle, tickle, or suck. At the same time, there is a clear distinction—expressed as a preference for the one rather than the others—between the mother and her sisters. When he is about six or seven a male child begins to spend more of his time with his father. He fetches the latter's pipe and may fill it and light it for him; he begins to use a jungle knife and imitates the full swinging slash and smooth overhand stroke associated with the male. The father, who has already planted trees for his son, begins to make the boy thoroughly familiar with the land he is using for gardening and hunting; he begins to teach the boy magical spells, rituals, and any special skills—such as treatment for snakebite, constipation, or boils; painting, carving, modelling clay cooking pots; or tracking, trapping, drumming, or dancing—of which he may be a master. Between them father and son begin building a relationship which may be expressed as a devolution of claims. Similarly, the mother's brothers are known to the boy; they secure for him a potential economic capital in the form of trees planted to his name, and a knowledge of their lands; and if the educative role is not as marked as the father's, it is there all the same. Finally, the boy comes into an active co-operative relationship with the members of those households which are co-operating with his; normally father's brothers or mother's sisters, he helps them build their fences, clear the forest for a new garden site, and harvest the ripened crops.

While the growing male comes into contact more often and more significantly with a wider range of kinsfolk—particularly the father's brothers, mother's brothers, father's co-operators—until a girl begins to menstruate she is almost exclusively associated with the mother and mother's sisters. From them she learns the skills and crafts of Tangu women. Almost as soon as she can walk she is looking after her younger siblings; she learns, very early, what wild leaves to gather as relishes, how to cook, carry, draw water, clear underbrush, weed, make string, and fashion grass skirts. She knows more myths, more games, more lore than her brothers; from her earliest days she is accustomed to continuous hard work and apparent subservience to men. As she comes of age she sees something of youthful sweethearts, and then, very soon afterwards, she is married and bearing the burdens of children and a household of her own.

Whatever the sex of the child he or she is born into an elementary family which is also the core of a household. Until marriage and while the household exists attachment to it is definitive: a child "belongs" to the parents, and if they should die while a child is still young he or she automatically comes under the care of the eldest surviving male of the household. Upon marriage, however, the spouses become the nucleus of a new and independent household, and the severance of the household

tie tends to weaken the links associated with the elementary family—particularly those between parent and child. Sibling ties remain strong—a full brother and sister are in the closest and most intimate of relationships—but even these may be waived if they prove too burdensome for the new household. The latter, whatever else it may be, is the basic economic unit ; and, in a sense, its primary purpose may be seen as a cradle for children as they grow up, and a point of departure for them as they enter upon adulthood. In addition, the households of children who are married are retreats for the aged—mothers to their daughters and fathers to their sons.

Because old women appear to live longer and are certainly more useful than old men, continuity from the past tends to be channelled through to the households of the present more often through women than through men. Old grandmothers have stamina. They are competent cooks, plaiters, stringmakers until the day comes when they drop, spoon in one hand, and the other still twisting the fibres on a horny hard thigh. They care for the children, telling them stories, showing them games, and rocking them to sleep. If only because they free the mother for other tasks they are valuable, an asset to a household. On the other hand, old grandfathers are passengers. Their claims on a household derive from sentiment and past services to one of the spouses and are not based on a current reciprocal relationship. They have no more to give. They do no work, they grumble, bemoan the old days, and constantly ask for food, tobacco, lime, ginger, and areca nut. They know many stories and may be wise, but they succeed only in boring their audiences with anecdotes of their prowess, and those who come for advice usually leave with fleas in their ears. They are a burden on the household that keeps them, and an early demise is not unmixedly sad.[4]

By selecting grandparents who are young it is possible to spell out a genealogy with a depth of five generations ; by accepting hearsay evidence one may reasonably extend the depth of a genealogy to six, perhaps seven, generations. Normally, however, few can go beyond what they have seen, and this limits ascendant genealogies of any particular informant to the grandparent generation. To obtain the names of four grandparents is rare, two is most usual, three and one not so common, and siblings of grandparents are rarely remembered by name. All over Tangu father's father and mother's mother are most commonly remembered ; for either sex father's mother and mother's father tend to drift into obscurity. If one grandparent only is remembered mother's mother emerges as preponderant : all females and many males remember, or have some knowledge of the mother's mother, while remembrance of father's father is generally reserved only for males. If three grandparents are remembered it is either mother's father or father's mother who is forgotten.

A bias towards the matrilineal line is followed out in relation to adoptive practices which also illustrate double unilineal succession to prerogatives. Should a household

[4] It may be noted in parenthesis that when men dream they dream most often of their fathers when they do not dream directly of food. The father appears in dreams to give advice, or to help, and while Tangu do not believe their fathers will become enemies and so give them wholly mischievous advice when they are dead, the full relationship between a man and his dead father includes the former's behaviour when the latter was old, helpless, and useless.

be destroyed by the early death of both parents while the children are young particular individuals may have claims on the orphans, but no constituted group has the exclusive right to exercise claims over them. Mother's sisters have claims to orphans whom they have suckled and cared for because they have done these things, and by doing them have made themselves as nearly mothers as they can be. Father's brothers have claims because they would, normally, have been co-operating with the father in gardening and hunting activities. But without the active co-operative relationship the claim merely through kinship has little force or substance. Similarly, the claims of mother's brothers have to be substantiated by trees planted and an active connexion with the children. Conversely, having claims also means incurring obligations. Unwanted orphans generally become a charge on the local community. Individuals who might have had claims are pressed to honour their obligations. But there is no formal and ultimate sanction : since no particularised group is responsible the adamant succeed in evading the implications of the obligation just as, in the case of orphans who are wanted, the more determined can press their claims to a satisfactory conclusion.

The strength of a particular claim depends firstly on the personal relationship as visibly expressed ; secondly, it depends on the energy expended in advertising the claim both while the relationship is being built up and when the claim is formally in issue. Interaction of claims and evasions resolve themselves, eventually, into a working adoption which only remains valid while the children adopted consent to the arrangement. In years gone by an orphan would have been a charge on the *gagai* and residential community with which the household had associated itself. In practice, today, mother's sisters are in the best position to show cause for a valid claim, and the younger the orphans are so are their claims stronger. In the case of orphans who are about five years or a little older—who can, in a general sense, manage for themselves—the claims of mother's sisters weaken in the face of counter claims of father's brothers where male orphans are concerned, and, to a certain extent, as against father's sisters where female orphans are concerned. Mother's brothers are normally content to back the claims of their sisters. Nevertheless, the older the boy is the stronger the claims of the father's brothers, and if, as is sometimes the case, he himself is married to a mother's sister, the mother's brother is content.

Tangu say that in the fairly recent past, during the period when *gagawa* were breaking down, a female orphan might be left to die. Today, it is generally left to the mother's sisters to make themselves responsible for her. That is, ultimate responsibility resides with female matrikin. On the other side, those most intimately associated with the dead parents and their children are, today, only too glad to have the children under their care and press their claims accordingly. Most often, the claims of a mother's sister married to a father's brother emerge as the strongest, and, their evasion incurs the most odium. In any case, however, no adoption is definitive without the agreement of the adopted ; no family can keep a child who prefers to live elsewhere. He or she will run away and live—and be allowed to live—where life is most agreeable.

3.

The totality of claims and obligations between the collection of individuals who constitute Tangu are resolved on a personal and face to face level within terms of two main sets of values: first, there are the variety of categories of kinship, neighbourhood, and friendship[5] whose ideal norms of behaviour derive, generally, from the historical past; second, there are the demands of current economic circumstances and political values which, since they are by no means consistent with the past ideals, entail explicit choices. Small children are in no position to make good any claims, and, ultimately, the mother and her sisters are responsible for their care and, impliedly, for nurturing embryonic claims. As children grow older they are more able to make themselves felt, more able to make good the possibilities represented by maturing claims and obligations. Descent, as a projection through time of properties and attributes conferred by lineal kin, emerges as a function of age, sex, and personal preference where the significance of the last mentioned is dependent on the first. At the same time, males, who must succeed to male prerogatives, generally do so in terms of the claims they can make good in relation to the father, father's brothers, and mother's brothers: and females are generally limited to making good claims deriving from the mother or mother's sisters.[6]

Formerly, an individual derived his right to garden or hunt particular lands in virtue of membership of a *gagai*, and his claims to extend the right were limited by other like rights within Tangu and the existence of relatively powerful and populous neighbours. Diawatitzir, Igamukitzir, Andarumitzir, Jumpitzir, Dakwenamitzir, and Kangwanitzir[7] constituted groups which, if friendly in other contexts, were generally inimical about who used which land. Streams, ridges, hillocks, outcrops of rock, and distinctive isolated trees such as the *Ficus* and wild *Canarium* almond marked formal boundaries and traditional battle grounds. At the same time, any individual who trespassed over these boundaries and found he could do so without let or hindrance continued the practice until a complaint was lodged. Having established a "user", however, the man who was initially a trespasser was in a position of some strength; removal necessitated a recourse to physical violence, or war, or sorcery. Action coming within these categories always had the support of a form or moral rationale in the shape of previously existing boundaries which were common knowledge to all. Nevertheless, and especially where a man had kinsfolk "over the way" or had taken a wife from there, if a trespasser chose to face the consequences and was sufficiently robust in mind and body to remain in possession, then, by making good his claim he came near to establishing a primary "right".

Such a "right" would not remain unchallenged for long by those who felt they derived claims from the former situation; and the stability of the new situation

[5] Cf. my "Friendship in Tangu", *Oceania*, Vol. XXVII.

[6] I exclude here, of course, claims that can be made good between spouses, siblings, and extended siblings.

[7] Neighbours of Tangu who occupied the land respectively north and north-west, west, south-west, south, south-east, and east.

remained a function of the energy and determination either party brought to bear on the case, and the alternative available. The relations between the various communities constituting Tangu were, in most ways, analagous with the exception that *gagai* memberships crossing community boundaries facilitated the resolution of claim and counter claim by more or less peaceful methods.[8] Particular tracts of land were associated with *gagawa* which were themselves associated with particular communities and parts of communities. A man derived his right to garden and hunt by virtue of his *gagai* or *gagawa*, and if he established a user on territory hitherto unconnected with the *gagai* he established a user for the *gagai*. The epidemic sickness that occurred about the turn of the century, and the migrations, fighting, and wife stealing that followed seem to have completely disrupted the intimate relation between land, the individual, and his or her *gagai*. The large aggregations of homesteads broke up into small groups which laid claims to certain tracts and made good their claims, or lost them, by their power to keep out intruders either by mystical means or with the spear. *Gagawa* multiplied as the formal rule was adapted to the new circumstances. Fresh territories, hitherto a " no-man's land " between Tangu and their neighbours, became associated exclusively with Tangu. At a rough estimate the total land habitually used expanded by about a third. Land was hunted right up to the banks of the Iwarum whereas before the sickness only the most intrepid would venture to within a mile. To the south and west of old Randam[9] lay vast areas of fertile ridges and swampland comparatively rich in fish and game of all kinds: into them came people from Biampitzir and Riekitzir. Not only was there plenty of land available, but, mainly as a result of the anarchic conditions prevailing and particularly because, in fact, land was in the names of those who could, and did use it, and who could, and did prevent others from trespassing, the *gagai* as a land-holding unit with particularised criteria of recruitment passed into obscurity. Those who were not able to maintain a particular user in the face of more powerful opposition moved over into new lands where they could establish a user without, or with less, opposition.

If a husband is asked why he hunts over and gardens in a particular tract of land rather than another he replies that he does so because the land is his, he knows it, he has always gardened or hunted there; or, because it belongs to his wife who has always been associated with it. Reduced to its elements the statement means that a household derives its claims to user of land from the parents of either spouse, and is using a particular portion rather than another either because it has no choice in the matter, or, because, having made a choice, it has been able to realise it. Children grow up in a household, they become associated with the land the household is using, and they know it. Other things being equal the association and knowledge places them in a position of strength as against those who have not used the land so much or who do not know it as well. If sons are gardening land previously associated primarily

[8] GT, p. 68.

[9] Randam is now almost wholly deserted.

with the father they point out that they are using the land just because they are sons of the father. He showed them the land when they were small, pointing out the better gardening slopes, the pools where fishing is best, and the places where game is most likely to be found. They know the land because they have used it, and others also know they have used it and know it. However, such knowledge and usage is never exclusive. Just as they have often visited their parents' siblings, have become acquainted with their lands, and have had trees planted in their names, so the parents' siblings' children have a variety of claims on the lands being used by the sons.

Maintaining the full sum of claims is considered desirable or important, and because no claim is invulnerable attempting to maintain or challenge particular claims results in frequent disputes. Fruit and nuts are gathered from trees in " extra territorial " lands, and dogs are taken on the chance of seizing some game, or the opportunity may be taken at a wayside halt by a stream to take some fish. These things are done to show that they can be done. If a man objects to a cousin taking game off his land, or fish from his stream, the cousin will reply that since he was shown over the land in his youth there is nothing to stop him—except a public dispute. If a man objects to his fruit being eaten his indignation is countered by those on the spot who point out that he should have come earlier—" Why are you angry ? The fruit was ripe—would you let us have it rot on the ground ? " And the truest of answers—which everybody knows whatsoever is said and which only makes the disagreement more bitter—is decidedly " Yes ! " For only by gathering and himself disposing of the fruit can a man maintain his claim to continue doing so. The lazy man has not witnesses. He who gathers the fruit is presumed to have a right, or a claim to do so made good. If the claim goes unchallenged the presumption is that if anyone had a prior or stronger claim he has allowed it to lapse—for himself and his descendants. And, logically, a claim that appears to have lapsed may be revived by the attempt to make it good. By forcefully challenging the claims of others it is possible to make them one's own.

Men who leave Tangu for periods of contract labour take mystical measures to ensure that their claims are maintained while they are away, and they also instruct a brother to maintain these claims pragmatically. Sometimes, however, in spite of the mystical techniques, a man with a lazy brother returns to find that another, tentatively at first, and then more and more often, has gone a fair way to establishing a prescriptive user. If such a trespasser suffers no harm from the mystical safeguards his continuing good health is itself evidence of the weakness of the claims of the migrant; similarly, a trespasser who sickens remembers his trespass, confesses it, makes restitution, and takes care not to do it again. On the other hand, should a successful trespasser attempt to consolidate his user by himself using mystical means of protection—and these result in the sickness of the returned migrant—the evidence of " right " in terms of claims made good is almost conclusive. No man can continue using land on which the mystical techniques of another are more effective than his own. In general terms, a " right " only exists so long as the claim to exercise it can be maintained in the face of counter claims.

4.

Formal claims to user of territory may be announced even though the precise derivation of the claim may be unknown, whimsical, or vague. Quite frequently a man of a woman may assert a claim to a particular tract which he or she has never seen. And there the claim rests.[10] It is based on nothing stronger than information handed down from parent to child. A man who has been shown over the land has some grounds on which to make an issue should he wish to do so; one who has actually hunted or gardened there is in a stronger position, and one who uses the place regularly has the strongest position of all. Yet, any given situation brought to an issue requires the support of a form either to maintain or dispute it; and the nature of the form, based partly on historical notions and partly on current realities, differs in various parts of Tangu. Everywhere males are more strongly placed if they state their claims as deriving from a male rather than a female, and similarly, women are best placed when their claims derive from females. A man working land previously associated with the father is strongly placed if he lives in certain areas of Wanitzir, Biampitzir, and Riekitzir. In Mangigumitzir and the hither portions of Biampitzir and Riekitzir he is vulnerable as against those claiming from the mother's full brother through the mother herself; but if the mother, after marriage, has been gardening elsewhere—outside Mangigumitzir—the claim is weakened. Particularly are the women's claims strong if they can be shown to be derived from the mother in the marches between Wanitzir and Riekitzir; correspondingly, the man's claims are stronger if derived from the father rather than from the mother's brother. In parts of Riekitzir where there is plenty of land available for all, existing users are derived by either spouse from either side of the unions that produced them. Nevertheless, when challenged households are weakly placed if their claims derive exclusively from the wife's father.

Each of the individuals composing a household has claims which, though they may be put to work for the household as a whole, do not coincide with those arrogated to the household as a unit. Take, for example, a household primarily associated with the land previously used by the husband's father. The husband himself has, at the least, claims deriving from his mother's brother which he may exercise with discretion to swell the productive potential of the household. The wife (or wives) has similar claims deriving from her own parents which the husband may attempt

[10] Two examples: (*a*) On hearing of a land dispute in far off Igamukitzir a man whom I knew very well suddenly leapt to his feet. "Why," he cried, "That is my land! My father's father told my father of it. Who do they think they are? I will go and tell them. I'll soon tell them whose land that is!" For the next ten days he reiterated his determination to go to Igamukitzir, hunt there, and argue in feasts just to show them whose land it really was. When the day for departure arrived he complained of a sore leg. Regretfully, he felt the journey would be too much. (*b*) Having taken game off lands in northern Biampitzir I myself became involved in a dispute regarding the disposal of it. Walking to south Riekitzir I told a friend of my troubles and where I had shot. "But" he said, "That is my land, my very own. The game belongs to me—you can do what you like in that land. It belongs to me." Since the claimant had never seen the land in question he refused to do anything more than tell me to go ahead. That is, he could not support his claim with substance.

to make good on her behalf. The children, as they grow older and more familiar with the territory associated with the household, and as they are shown over their parents' siblings' lands, gradually build up for themselves series of claims of varying strength. One son having a particular personal affinity with a certain mother's brother may, through more frequent visiting, create for himself stronger claims than a brother who tends to dislike the mother's brother and who, consequently, finds something else to do when a visit is projected. Other siblings build up more intimate personal relationships with other kinsfolk, and the parents may establish strong connexions with their siblings' children.

Eventually there comes a time in the life of a household when the sum of the claims held by the individuals comprising it begins to be divided up into the households of the children. The husband ages and his visits to kinsfolk grow less and less frequent; so do the claims he himself can make good become fewer and fewer. As they lapse so are they taken over by the succeeding generation. Sisters' sons are asserting their claims to the trees he had planted for them and are attempting to hunt over his land. One or more of his sons—who have decided to continue in association with the household land—are trying to curb the inroads of their cousins whilst at the same time attempting to make good the claims that derive from their own mother's brothers. Persistent endeavours to make good some claims and establish others results in quarrels and, eventually in open disputes. The latter, however, rarely yield any permanent reallocations of " rights " but they do necessitate seeking out allies, supporters, co-operators, and identification with influential men. Partial retreats and shifts in alliances are involved; and those who cannot make good their claims in one direction may find that by concentrating their efforts in another they may be able to realise a part of all that they claim. Tangu sum up the situation and the process when they say that after a marriage a couple goes where the prospects are best.

In practice a couple setting up as an independent household have four potential sets of claims—which are neither exclusive nor equally weighted—deriving immediately from or through each parent where those devolving from the wife's father may normally be neglected as generally impracticable. The choice a couple make in the circumstances represent those claims which they feel they can realise; and only those claims which they themselves realise can they hope to pass on to their children. In their turn each of the latter is uniquely placed within a constellation of kin ties so that some claims, not necessarily exclusive, are more easily realisable than others—and these they normally try to make good. The historical norm, framed as an ideal, may be recruited in support of a claim; more effectively, the claim may be supported by what appears to be current and general practice; and finally, most useful of all, there are the concrete and visible expressions of particular relationships and practices.

Sometimes the three forms may coincide with each other: in other circumstances they do not. Each succeeding generation takes the claims of the preceding generation as a point of departure, and from this datum individuals attempt, by a use of the forms—primarily the last—either to extend or to consolidate their claims. Neither

spouse transfers *in toto*, or equally, to any of their children the claims he or she has made good, and in the third generation the claims of the grandparents are by no means distributed in particular lineal descendants. At the same time, purely formal or even sentimental claims and associations travel double unilineally. Thus, claims of the paternal grandfather may be found adhering to Ego (male), and claims of the maternal grandmother may be found in Ego (female).[11]

All claims and associations, whether on land, things, or persons, have economic value which, when made good, are put to work for the household; they build up prestige which is translatable into political influence and action. And since claims are only maintained, established, and made good by challenge and manoeuvre, by some temporary and other more permanent alliances with this or that household or group of households, the claims a household chooses to realise, both initially and subsequently, are essentially political choices.

5.

When households combine to produce foodstuffs for a series of feasting and dancing exchanges the husbands of a co-operating group are said to be brothers, and the wives sisters. Conversely, husbands, or wives, who are in co-operative relationships stand to each other respectively as brothers, or sisters: the co-operative relationship is evidence of brotherhood between males and the sisterhood of females. Ideally, the genealogical relationships should coincide with the kin categories: married brothers who might be sons of the same couple, *mwerz ungunwan*, or have a common father or father's father, ought to be in actual or potential co-operative relationships; and married sisters who are *mwerz ungunwan* ought to be in co-operative relationships. That is, the co-operative or (temporary) jural group should be built round either female matrikin, or male patrikin, or male matrikin, or around brothers who may be either or both patrikin and matrikin. The exchange or oppositional relationship is always expressed as a relationship between brother and sister: the wives of one co-operating group of households should be, or stand as, sisters to the husbands of the other, and the husbands stand as brothers to the wives of the group in opposition. That is, a group of co-operating brothers co-operating to exchange food with the households formed by their married sisters.

Ideally, a community should, in any horticultural cycle—which is also a feasting and productive cycle—consist of two main, roughly equivalent, groups of households each of which co-operates within the idiom of co-operating brothers, or sisters, and is in an oppositional or exchange relationship with the other. Consistently, everywhere in Tangu, the ideal marriage, derived from a bygone age, supports the form of a dual division of the community. A male should marry a girl in the category of mother', brother's daughter, and there should also be a brother and sister exchange so that a man's sister marries his bride's brother. In this way two pairs, or two groups of

[11] Note 10(*a*) above contains an example of this.

households, come into an exchange relationship across the brother and sister links while in either group the husbands are brothers and the wives are sisters. Given a community with roughly equivalent numbers of males and females, an even and equal reproduction rate of females and males per married couple, and an agreeable mortality rate, the ideal marriage may be seen as a support or as a means to the end of creating a community divisible in half by genealogical criteria which coincide with the categories of kinship and are consistent with the exchange relationships involved. Within these terms either patrilineal, or matrilineal, or double unilineal descent would be consistent with the end result. If accident and uneven reproduction rates are to be allowed for descent must necessarily be either ambilineal, or patrilineal or matrilineal or double unilineal with a device for opting out of the rigid descent form. Alternatively, the end could be attained if particular persons were willing to be fitted into kinship categories irrespective of their genealogical kin affiliations. It could not be attained if descent were decisively not ambilineal, nor if there were no choices available : one group would expand at the expense of the other and so ruin the balance between the two halves of a community.

The historical situation shows that whatever the dominant preference in any particular part of Tangu there was always a choice to opt out[12] and this combined with a residential choice seems to have sufficed, for a time at any rate, to keep the balance. Today, co-operative groups of households constitute quasi-political units the cores of which may be composed of brothers or sisters in the requisite genealogical relationships, but which, as entities, are recruited and held together by men of unusual productive ability, shrewdness, and political acumen, whose influence and powers of persuasion do not derive from a position within the kin structure and only lasts as long as their ability to produce quantities of foodstuffs. The composition of such groups varies, and is not stable over long periods of time : the cores may remain stable, but other households may secede in order to compose a more effective and advantageous alliance with another dominant personality. Everywhere in Tangu the core of a co-operative group consists of two or three brothers, or sisters, born of the same couple. In Mangigumitzir these cores are most often built round sisters who are *mwerz ungunwan*, and very nearly as often round brothers who are *mwerz ungunwan*. Nevertheless, it does happen that brothers, or sisters, who are *mwerz ungunwan* come into exchange or oppositional relationships. The same is true of the hither portions of Riekitzir and Biampitzir. In other portions of Riekitzir and Biampitzir, and also in parts of Wanitzir, co-operating husbands find their brotherhood in a common father or father's father. In yet other parts of Riekitzir, Wanitzir, and Biampitzir the core of a co-operating group consists of brothers, or sisters, who may be *mwerz ungunwan*, or sons of the fathers, or both.

Households which co-operate tend to have contiguous lands. This does not mean that a whole co-operative group is composed of households hunting and gardening lands that adjoin one another ; it does mean, however, that a co-operative group may

[12] GT, p. 69.

be divided into smaller units of two or three households which, for the time being, have a common user of contiguous lands. Other households within the group will have lands and gardens elsewhere, and it often happens that those in exchange or oppositional relationships have gardens and lands that adjoin. Apart from shifting adherences to influential men, tiffs, petty quarrels, presuming too far on the co-operative relationship, personal dislikes, and incompatibilities of temperament—each of which receives expression through some misdemeanour in relation to food and its production—also serve to split the group. Conversely, those who like each other in a general, but deep, moral sense, tend to come together in co-operative relationships. Full or halfbrothers, or cousins, are sometimes found in oppositional relationships—where one would expect them to be co-operating—because only within this relationship with its relatively explicit range of conventions can they find a mutual respect and coexist without one destroying the other. On the other hand, husbands who might be expected to be in oppositional relationships often co-operate with each other for the same reason ; other husbands co-operate because their wives are sisters and insist that they do so ; others because, having contiguous lands, they can produce more by a common user of their several lands. Conversely, husbands who are over particular—and so apt to be quarrelsome—sometimes prefer to be circumscribed territorially by those in oppositional relationships for in this situation a trespass can be fought out in open debate, or prevented by stringent mystical means, whereas co-operators who presume too far have to be suffered, handled with restraint, or broken with.

Such preferences as have been listed are subject to, or occur because of, the claims particular individuals are able to make good in the circumstances. In turn, the preferences are dependent on the co-operative activity, the means to the end of making a series of feasting and dancing exchanges. That is, recruitment to the co-operative group which is also the (temporary) jural group depends upon which claims, initially and subsequently, particular households are in a position to make good.

All claims are subject to the overriding ideal of equivalence, a prime moral value which is also the critical norm governing all social and interpersonal relationships. All exchanges should be equivalent : if an exchange is not equivalent—and because exchanges are in foodstuffs " faulting " is relatively simple—it leads to troubles and disputes in which neither party is considered guiltless, and which can only be resolved by a further series of festing exchanges in which equivalence is made explicit, or by realigning the members of co-operative groups so that equivalence emerges from the ensuing exchanges. As influential men can only become so by demonstrating superior productive ability in feasting exchanges—where the exchanges must be equivalent—it follows that they must exchange with equally competent men, or equally competent groups managed by men who are as industrious and able as they are themselves. Their influence depends not on dominance, but on maintaining equivalence ; not simply in recruiting a large number of co-operating households, but in recruiting a group approximately equivalent to another and amongst whom his own contribution to the exchange will appear as outstanding. Equivalence implies—even demands—that

no dominant group shall emerge, and it is entirely consistent that the structure of a community should be built upon the feasting exchanges between two approximately equivalent groups of households. Further, any inordinately large or powerful group of brothers, or sisters, whether putative, of the father, or mother, or both, must fragment if the system is to continue functioning as it does within the same set of values. Today, as in the past, recruitment to the co-operative group is dependent upon not having a positive value in lineal descent. In the past this value was expressed as a preference with a choice to opt out of the preference: currently, one may say that recruitment to the politico-economic groups depends upon criteria consistent with the end rather than upon particular kinds of kin relationship.

6.

Whatever lineal relationships are selected from a genealogy it would require a map of Tangu and environs to locate it in space. Especially in Riekitzir and Biampitzir is the social movement from generation to generation associated with considerable movements through territory. In Mangigumitzir the spatial shifts tend to be over short distances, zig-zagging or circling within a comparatively small circumscribed area. Nevertheless, many genealogies lead into Igamukitzir and Diawatitzir as well as into the other Tangu neighbourhoods. In Wanitzir also, though there are many extensions into the surrounding areas the majority of such spatial movements take place within a relatively narrow compass. Much of the movement must necessarily be attributed to historical events, to the sickness and local migrations that followed. On the other hand, myths and exterior evidences[13] indicate that agnatic and uterine lines were always associated with traverses across country—without being always, inevitably, or necessarily so associated. Rather are the myths a comment on the fact that marriages between members of different communities take place, and, emulated in the children and children's children, the ancestors tend to become as remote in space as they are in time. Claims may tend to devolve within a range of particular patterns—not one of which is exclusive—but they do not devolve in relation to defined lineal kin even though the latter, together with associated claims, may be held accurately in memory.

In the past, the device for opting out of the firm preferences relating to what kinds of kin should form co-operative groups—to the mother's brother in the mainly patrilineal communities, and to the father in the mainly matrilineal communities—was consistent with maintaining a community composed of two mutually opposed and equivalent groups in an exchange relationship. Today, though the structure of a community remains wedded to the ideal of two opposed equivalent groups, the current forms of political leadership are closely dependent on the changing composition of co-operative groups whose recruitment does not necessarily depend upon kin affiliation but does depend upon a series of politico-economic claims desired to be

[13] Cf. my "Social Implications of some Tangu Myths", *South-western Journal of Anthropology*, Vol. XII, p. 427.

made good. Clearly, succession to prerogatives is at once double unilinial and, since males succeed to mother's brothers as well as to the father, biassed matrilineally overall. Or, to put it another way, the claims of females tend to be made good more easily by adhering to female matrikin, through the matrilineal line, and the claims of men tend to be made good—in so far as they devolve from the preceding generation—either through the patrilineal, or the matrilineal, line, or through both. At the same time, mainly owing to the influence of the mission, youths are turning more and more to their fathers and explicitly ignoring the mother's brothers. They say " Mother's brothers belong to the old days. Now, we follow our fathers." In their turn mature men with children are looking more and more to their sons at the expense of their sister's sons : " My sister's son ? Let his father look after him—I have my own to take care of." The trend among males is towards patriliny. On the other hand female matrikin solidarity remains strong and it is difficult to envisage a disruption in favour of overall patriliny.

K. O. L. Burridge.

THE CASTE BARRIER—AN OBSTACLE TO THE ASSIMILATION OF PART-ABORIGINES IN NORTH-WEST NEW SOUTH WALES.

By RUTH A. FINK[1]

IN recent years considerable emphasis has been placed upon the problem of the part-Aborigine and his place in the community. While the number of full-blooded Aborigines throughout Australia has steadily declined, the number of half-castes has increased in some cases by as much as threefold in one generation.[2] This high fertility rate in a group of people who are in many areas economically insecure, and tend to have a low standard of living, has resulted in growing apprehension that if measures are not taken to absorb them into the community, they may become a considerable social problem in the future.

Throughout Australia to-day, Departments of Aboriginal Welfare are attempting to deal with the situation, by pursuing a policy of assimilation, and by giving Aborigines every opportunity for advancement and education. There is now strong public support for the idea that they should be entitled to the same legal and social status as any other Australian citizens, and much of the old Protective Legislation has been revised to conform more closely to the new goal of assimilation.

However, in many parts of the Commonwealth, people of aboriginal descent are still handicapped by outmoded legislation which was formulated at a time when assimilation was not envisaged as a solution to the problem, and when there were still many who supported the idea that the coloured population should be segregated on settlements or reserves and that they were incapable of accepting responsibility.

The enlightened policies of to-day are a relatively new development, and many of the prejudices of the past still persist. The adult mixed-bloods of to-day have grown up in a society which looked upon them as the descendants of a primitive race, and which regarded them as incapable of living like white people. Such ideas are still widely prevalent, and they have led in some cases to the development of a " caste barrier " which limits the social mobility of part-Aborigines and prevents them from participating freely in the social life of the small country towns in which they live.

A caste has been defined by Queener[3] as " a group of people assigned opportunities on the basis of criteria over which they have no control ". Caste sets a limit to social

[1] This article is based upon four months' field research in north-west New South Wales in 1954. The research was carried out under the guidance of Professor A. P. Elkin of Sydney University. A report was submitted as an M.A. thesis in 1955 under the title " Social Stratification—a sequel to the assimilation process in a Part-Aboriginal Community in N.S.W."

[2] *Annual Report of the Commissioner of Native Welfare, Western Australia*, 1956, p. 7.

[3] E. L. Queener, *Introduction to Social Psychology*, 1951, p. 170.

mobility. There is an arbitrary point in the status hierarchy of the society above which the lower caste individual cannot rise. This limit to upward social mobility may be termed the " caste barrier ". Where there is a rigid caste barrier no degree of accomplishment will enable a lower caste individual to participate in upper caste social circles and activities.

Ethnic identity is one of the most common criteria of caste. Where a society regards certain ethnic groups as inferior, a caste barrier soon develops to prevent these groups from merging into the dominant or upper castes of the society. In its extreme form the caste barrier may lead to outright segregation of the lower castes—such a situation has arisen in South Africa with the policy of apartheid.

Assimilation is essentially a denial of caste. As a policy it aims to extend equal opportunities to members of the lower castes and thereby to permit them upward social mobility. When a caste barrier has existed for a considerable period of time, the change over to a policy of assimilation may meet with resistance. This has occurred in many of the outback towns of N.S.W. where a caste barrier has existed for so long that it is proving very difficult to break down, and part-Aborigines are unable to achieve genuine assimilation—they are only tolerated as members of the lower-caste group.

In the small town of " Barwon " in North-west N.S.W. the caste barrier has remained relatively stable. Those who possess aboriginal physical characteristics have very limited opportunities for social mobility—their colour is a symbol of low status. The stability of the caste barrier has been brought about by two main factors. Firstly, by pressures from within the white community, from those who wish to maintain the caste barrier and exclude coloured persons from status-enhancing occupations and social activities, and secondly, by pressures from within sections of the coloured community, from those who reject the ideal of assimilation and whose way of living to some extent justifies the caste prejudices.

The social life of an outback community is usually dominated by a small social clique which is made up of influential citizens, who run the social activities of the town. Such cliques are often colour conscious, and resent the intrusion into their social circles of persons possessing even a small amount of aboriginal admixture. These social cliques can influence the behaviour and attitude of most of the white town dwellers, for many of them are insecure of their own status, and while they strive to further their own social mobility, they are unwilling to risk public disapproval by any social intercourse with coloured people.

In such a situation, the only way in which coloured people can hope to attain status within the non-coloured group, is by trying to breed out the coloured element through marriage or liasons with white or lighter coloured individuals. For it is only by ridding themselves of their aboriginal features that they can escape the stigma of the caste barrier.

This leads them to adopt attitudes of rejection toward their own colour, and anything that is symbolic of their origins. The status conscious coloured person is forced to prove that he does not in any way belong to the coloured group. The mode

of granting the certificates of exemption or citizenship which have become the legal symbols of assimilation, also helps to reinforce this feeling of rejection. To obtain such certificates in N.S.W. an Aborigine must satisfy the Welfare Board that he is a fit and proper person and that he lives independently in the general community and does not live on a reserve with other part-Aborigines. He is thus forced to break his ties with other members of his group in order to obtain full citizenship.

Let us examine some of the behavioural alternatives which are open to a coloured person who is faced with the caste barrier. One solution is for him to assert himself actively and to deliberately ignore the existence of the barrier. He may try to prove " I'm as good as the next man ". Such a choice may not have the desired effect ; it may lead to a flare-up of racial tension, and instead of gaining in status, he may become the butt of a prejudiced community.

An example of such a situation occured recently in Western Australia. A coloured railway guard wrote to a local paper, complaining that he had been refused a hair-cut, because the barber had introduced a colour line. This man was a part-Aborigine and a returned serviceman, and was trying to assimilate himself within the community. The incident made headline news in papers throughout Australia, and as a result of so much publicity, it had the effect of heightening racial tension within this town.

Being present in the township at the time, I noted the development of a schism within the white community into those who supported the man and those who condemned him. Rumours circulated that he was a " no hoper ", did not look after his cottage, and was a bad character. At first numbers of white people supported him, but gradually they ceased to do so. They even censured their local Church of England minister for having written a letter supporting him. Social pressure was clearly increasing rather than lessening the caste barrier. The barber began to exclude other coloured people who had long been accepted by the white people in the town. The railway guard was to some extent ostracized in the hotels, and people who were formerly friendly no longer spoke to him. The sequel to the incident was that he became embittered and came on duty drunk. As a result he was dismissed from the railways. He made no attempt to appeal, but appeared unconcerned that he had lost his job and house. The townpeople regarded this as proof that they had been right all the time.

In Barwon, N.S.W., we find an alternative solution. Instead of trying to force though the caste barrier, the status conscious coloured group formed a little social clique of their own, which had social activities which resembled those of the white groups.[4]

If the occasion had arisen, and they had seen an opportunity of entering real white social groups, these people would have had no hesitation in cutting themselves completely adrift from their former associates in the " near-white " substitute clique.

[4] Compare M. Reay and G. Sitlington, " Class and Status in a Mixed-Blood Community (Moree, New South Wales)," *Oceania*, Vol. XVIII, No. 3, pp. 179–207.

In Barwon there were 25 part-aboriginal households who formed such an exclusive clique. For convenience, we shall refer to them as the " Upper " group. Upper families were generally lighter caste individuals who had completely disowned their darker kinsfolk, who lived on the Government Aboriginal station (known as the Mission) nine miles from the town. They had all originally grown up together on the Mission, but in the late 1930's and early war years, the Upper group had begun this movement into town, in an attempt to assimilate themselves.

The process of moving into town, away from the Mission, can be taken as an indication that a particular family has begun to climb the " status ladder ". By moving into town, even if only to its outskirts, they have become independent of the control of the Aborigines' Board, and there may be a chance of intermarriage or entry into the social life of the Upper group. There is a transition group between Mission life and Town life, whom we shall term the " Middle " group. They have in common with the Upper group, the desire to live like white people, and to enhance their status. The mere fact of being in town, and sending their children to the State school, with the white children, tends to make them feel improvement in their status. Both Upper and Middle groups look down upon their Mission kinsfolk, and will have nothing to do with them. To live on the Mission is to them symbolic of being coloured, and acting like a coloured person. This is because there are many darker people in the Mission group, and because many of them do not try to assimilate but have accepted their low status as inevitable and live accordingly.

Though the Mission, or " Lower " group, shows the least desire to assimilate to white ways of living, they have retained little traditional aboriginal culture. All groups have undergone detribalisation, and far-reaching changes have occurred over the many years since the first white settlement in the district, so that apart from a few " vestiges " of aboriginal culture, one could not class this group as " Aboriginal " in the sense of having a living traditional culture of its own. Nevertheless, this Lower group is " aboriginal " in its self-image. It looks upon white people and their ways of living as undesirable and tends to reject many values commonly associated with white people. It accepts the fact that it is " different " from white people, and uses this fact of difference as a justification for various group behaviours which have the effect of continually pulling down the status of the group. Such activities as gambling, drinking in excess, wasting money, and neglecting homes and personal appearance all have the effect of emphasizing their social distance from white people. Not all people go to these extremes, but there is a tendency to associate such behaviours with the Lower group. This type of reaction is an aggressive assertion of low-status ; it seems to say " Look at me—I'm coloured and I'm dirty, drunken, lazy, irresponsible like they all say—that's my privilege, because I'm coloured—I can do as I like, because that's what they expect of me anyway ". It is this sort of reaction which has become another stabilising factor helping to maintain the caste barrier. For such people can continually be used as examples to rationalise the barrier. They are the " living stereotypes " which give it apparent validity.

Those Lower group aboriginals who conform in their behaviour to the white stereotype of what an Aborigine is like, form a concrete example of Robert Merton's principle of the " self-fulfilling Prophesy " : " a false definition of the situation evoking a new behaviour which makes the originally false conception come true."[5]

While there are some Lower group members in whom resistance to assimilation may be extreme, there are many others who are really only members of this group by force of circumstance—by their darker colouring and distinctly aboriginal features, or by their poverty. They may share the values of the Lower group, and may resent white people and Upper group coloured people, but they would soon seize an opportunity of joining these groups if the occasion arose. Thus there is potential for change even within this group, as evidenced by the increasing number of Mission people who move into town. Certain environmental influences on the Mission seem also to effect changes.

During my stay at the Mission, a family of coloured missionaries was beginning to convert certain members of the Lower group to Christianity. This was a form of Christianity which emphasised mainly a conversion to white values ; thus one only became a Christian if one gave up drinking, gambling, swearing, and wasting money. During the two years after my field study nearly all the Mission people have turned Christian, showing that there must have been considerable status aspirations dormant within the group.

There is a definite relationship between membership of the Upper group and marriage to a lighter coloured or white man. In eleven of the 25 Upper households, (or 44%) the women were married to white men. None of the women in the Middle or Lower groups were married to white men. In 8 Upper households, women were married to light quadroons—that is 32%. And the remaining Upper household women were married to half-castes who owned some property.

The Upper group women had all been brought up on the Mission, and had come into town to take employment as domestics and helpers in the hospital and cafes. There they met their husbands, and then severed all connection with their kinsfolk on the Mission. Some of them were educated at Cootamundra Girls' Home, and later returned to Barwon, determined to get away from Mission life.

Most of the men of the Upper group hold Exemption Certificates, which exempt them from the regulations of the Aborigines' Act. They are no longer under the jurisdiction of the Welfare Board. They have the same legal status as white citizens, and are permitted to drink alcohol, which non exempted Aborigines are not permitted.

Most of the Upper group men, both white and part-Aborigine, are unskilled or semi-skilled workers. There are only a few skilled workers, such as one mechanic, two carpenters and linesmen, and a nurse—the rest are shearers, labourers, and station hands. By occupation the Upper group do not differ from the Middle or Lower groups. The caste barrier restricts the socio-economic status of the Upper group for even they are unable to take certain jobs because white people would object. Only

[5] R. Merton, *Social Theory and Social Structure* (1957), pp. 421–436, especially p. 423.

very light coloured ones can obtain work as waitresses in the Cafe, and none work in dress shops, offices or any white-collar occupations.

The status ambitions of these Upper families over-ride any feelings of attachment to Lower kinsfolk. There are nine Upper households with siblings in the Lower group yet none of these brothers and sisters are on equal social terms. As one of the Lower group put it : " Some of these townsfolk who think themselves better than the Mission folk would rather see a ghost at their front door than one of the Mission people ", and another said :

" This is one town where the blacks won't pull together . . . The townspeople would just as soon see their own folks on the Mission put into gaol and stamped down. There's no people pulling together in Barwon—they're just at one another—one lot trying to make out they're white, the other lot trying to live a little decent and respectable ".

The Upper group are ashamed of their relations, and openly show this reaction. One Mission woman described their behaviour thus :

" They think the people on the Mission are all dirty, they laugh whenever the Mission lorry comes into town. They turn their backs when Mission people walk past them in the street. The women are furious when their Mission cousins get drunk and come up to them in the street and say " Hello, sis." or " Auntie ". They are always laughing and whispering about how the Mission people carry on ".

Though the Upper group show signs of colour prejudice against their own relatives, they are nevertheless extremely sensitive to any such prejudice when it is directed against themselves. This relates to the fact that in their self-image they are white people, and to be thought coloured or black is to them a serious insult. For example, when they have to go to hospital they are very indignant at being put in the coloured ward, especially as it often happens that a lighter sibling is permitted into the white section. One woman refused to pay her bill because she was put in the " black ward ". Another source of annoyance is when the publicans demand to see their exemption cards, though they are well known in the town.

Among the Upper group there is constant pre-occupation with the theme of colour. When babies are born, the women all go to the hospital to see the colour of the child. One woman tried to scrub her younger sons with solvol to lighten their skins. Stories are told to demonstrate " whiteness " ; for example, one woman said " The manager on the Mission told my family, " you must leave the Mission because you are too white to stay here ". Another woman who was in hospital and distinctly aboriginal in appearance said, " The nurses wanted to put me in the white ward, but I wanted to be with my friend in the dark ward ". This demonstrates that for the Upper group rejection of colour is the only solution to social mobility. But even this does not ensure their social acceptance by white people.

To the white people of Barwon the coloured people are all the same. They do not distinguish between Upper and Lower groups ; they still class them all as blacks. The local policeman for example said : " The half-castes are all a bad lot because

they get the worst white blood ; none are any good ". The only white people who mix socially with the Upper group are whites who have intermarried with them, and these people have thereby lost their status in the white community.

On social occasions when both whites and Upper coloureds mix, such as the weekly dances, the hall is divided into " Coloured " whites on one side, and real whites on the other. Only an occasional white boy dances with the dark women. The Upper group hold birthday parties, euchre games and dances of their own.

Most of the Upper group are careful with money and save to furnish their homes. Some of these are well furnished and comfortable houses, but others are poor dwellings, and superficially seem no better than Lower group dwellings. All the Upper women are very particular about cleanliness, and they always come to town well dressed. Many of the Lower group women are also particular about their appearance when they come into town.

The women are the most status-conscious group in this community. They are the only ones who can take the steps necessary to increase status, namely by marriage to a white man. Very few dark men marry white women, as there is tremendous feeling against such matches on the part of the white community. Dark men, therefore, possess lower status than dark women. Many of them find it difficult to find wives, for the dark girls do not wish to marry them, and they are often forced to accept older or undesirable women. While the women can leave their group and move upwards, men generally cannot. Perhaps this is why men seem to show more signs of maladjustment than women, for it is mainly the men who drink and quarrel, and seem dissatisfied.

The Mission people live an isolated life. They meet few white people, other than Mission managers, which fact in itself mitigates against their assimilation. As a result of their isolation they are shy and self-conscious, and react strongly to the presence of white people in their midst. As one man put it :

" The people on this Mission have never mixed in much with the white people—they never got away among the white people—they live here and don't like white people to go among their company. They feel they don't like a white person to see them cooking down in the ashes and near the dirt and eating their own food—their natural way of thinking is that the place is not decent and good enough. The blacks feel shy and ashamed of himself . . . they think white people are higher-ups ".

Among these people the word " Wodjin " or white women has a certain insult value when used for a person known to be coloured. For example, they refer to the Upper group women in mocking tones as " Black-Wodjins " and speak about their adoption of white ways as " trying to be flash ". " The black Wodjins won't eat kangaroo any more—they won't own up that they ate it when they were kids ". Mission people do not reject their colour ; they have no desire to be like a white person. White people are thought to be snobs, and " flash ", and intent on impressing other

people all the time also, they are regarded as untrustworthy, and always ready to cheat the coloured person. One Lower group man stated :

" The white people won't bother speaking to you unless they want something from you or are out to take you down ; white people think about nothing but how dirty black people are ".

Because they expect to be exploited by white people, many of these people are not adverse to exploiting white people if they get the opportunity.

One of the main barriers to assimilation among the Lower groups is the emphasis placed upon group conformity. There is an attempt to " pull everyone down to the same level ". Certain ways of behaving have become habitual for this group, and anyone who tries to be different is liable to become an object of gossip. Since there is a tremendous fear of being shamed or talked about by other people, this makes for conformity. If people try to outdo others then they are talked about.

Anyone who wears better clothing or saves up money and buys a car, or holds a steady job is considered to be " flash ". For example, one boy was offered a job as porter on the railways, but refused though he had the necessary education, on the grounds that " the other dark boys in town would laugh at me ". One woman who for nine years has helped on the Mission has constantly to put up with subtle pressure from the others who try to make her leave the job, by " dropping hints " that she is " crawling to the management ".

Another group pressure is directed to the sharing of possessions. A Lower group man stated :

" The people always share everything they own, and this stops anyone having any incentive to learn or to do better ".

On the Mission, anyone who has either food or possessions shares these with relatives who have none, or exchanges them in return for a small favour. This pattern probably originated in the aboriginal custom of reciprocity, but its modern counterpart has become very one-sided, and some people are always lending while others are always borrowing. Many people have no incentive to accumulate possessions because they know that as long as they are on the Mission the others will not allow them to keep these things for themselves. What I took at first as a sign of extreme improvidence later proved to be simply an unwillingness to purchase anything more than one's immediate needs because others would only come borrowing things.

Although many of the Mission men were employed all the year round on stations or the railways and earned good wages, there was little sign of this in the average Mission household. In fact, any outsider looking at the houses, and seeing the children running about would be struck by the apparent poverty of the place. To understand this situation, one must examine some of the attitudes to money, and the spending habits of the Mission group. These habits are closely related to group values and social obligations, but they also relate to the fact that these people don't want to assimilate or improve their status, so there is little point in saving money. It is only among the status-conscious Upper group that saving becomes important.

Mission people regard money as something to spend and circulate. They spend to derive immediate satisfaction. Many white people disapprove of their spending habits, and advocate that their earnings should be controlled, but it is largely the system of control which was responsible for the present attitudes to money, for they were never able to learn the real value of money. Years ago they were not paid wages, but simply given food and clothing, their wages being paid direct into a store account. Thus they did not handle much money and regarded it as something additional. This same phenomenon has been observed among similar groups in Western Australia, who have also had their earnings controlled. Now that they are free to spend their money, they take a pride in showing that " they can pay " and that their money " is as good as a white man's ". Unscrupulous white people often take advantage of them, and shopkeepers overcharge them, knowing that they will not quibble over money.

One of the ways in which quite large amounts of money are spent, is on taxis, to and from the Mission, and from one town to another. However, the use of taxis has a deeper significance ; they derive pleasure from using taxis because it is one of the few situations in which they can " employ " a white person.

The somewhat defiant attitude to money is summed up in the following comments :

" Everyone has a right to decide for themselves what they shall do with their money ; if they want to gamble or spend it on taxis, that is their business . . . People don't want to save money to buy a car as long as they get their little fun and pleasure out of what they ride in ".

Since Mission households have frequent visitors, from among their distant relatives, and since there are often unemployed people, these have all to be fed by the households, and the wage earner has to support many others besides his own individual family. His wages may have been sufficient to provide for his wife and children, but when they have to extend to much larger groups of needy and unemployed relatives there is little possibility for saving. One cannot refuse help to others who are in need, for one would then be talked about. One woman on the Mission was so generous to her neighbours and their children, that she would let them help themselves to anything she had, and she often had barely enough for her own family ; this gave her great prestige with the other Mission people, but it resulted in her continued impoverishment.

In some families, a large part of the income is spent on liquor and gambling. About 50% of the wage earners on the Mission consumed alcohol despite the fact that it is illegal for part-Aborigines to do so. This meant that they had to pay more for it, and also that they risked fines and imprisonment for being found drunk or with liquor in their possession, which would in turn affect their earning power. The police are always on the lookout for drunken Aborigines, so they are not infrequently arrested for liquor offences. Drink itself has become a symbol of defiance. It symbolises the Caste barrier to most part-Aborigines, for they cannot see why they should be forbidden to do things which white people can do with impunity. The liquor regulations become a reminder of their low Caste status, and for this reason

the drive to obtain liquor becomes heightened, and its effects are more marked. There can be little doubt that the Caste Barrier is one of the precipitating causes of the "drink" problem among Aborigines.

About 50% of Mission dwellers were inveterate gamblers. There were small gambling games during weekdays among the women and unemployed men, to fill in time; the bigger gambling schools started when the men arrived at weekends with their pay cheques. Mission winners often took their winnings into town and played against town Coloured people. Some Mission people were very improvident; they gambled and then relied upon the generosity of their neighbours to help them if they lost.

Since there were more darker-coloured individuals in the Mission group, and their physical features marked them out as Aborigines, it is not surprising that Mission people tended to accept the fact that they were "Black". They regarded themselves as "blackfellows" and tended to adopt a sympathetic and nostalgic attitude to their past culture, but there was little evidence of its survival into the present.[6]

The last "corroboree" was held at the Mission in 1931, and that was only a public display for the benefit of white townsfolk. Managers on the Mission have discouraged any aboriginal practices which came under their notice—for example, wailing at funerals. Furthermore, the present generation of adults were brought up in dormitories as children, and separated from their parents during their schooling, so that parental cultural influences were minimised. The managers of the Mission did their best to imprint upon the children's mind that the practices of the old people and their parents were primitive and barbaric, and that they must not imitate them. As a result, all the people on the Mission are to-day ashamed of anything connected with aboriginal life.

They are ashamed if white people see them eating their native foods, and will cover up the food in embarrassment if they are caught unawares, or if they are seen cooking meat in the ashes in the traditional manner. They still cultivate certain skills in bushcraft, tracking and hunting after animals, as these are useful to their station employment. But since the death of the last old people in the 1940's, there has been a steady decline in interest and adherence to traditional culture; it has lost its function and meaningfulness in this changed situation.

One of the few links with the past is in the realm of fears and superstitions. People on the Mission still believe in the efficacy of curses, and in ghosts and supernatural happenings; and their fears are sufficiently great to influence their behaviour. For example, they do not like to go out alone at night, nor do they leave their doors unlocked. Of course, there may be other reasons for this as well, but there have been some generalised outbreaks of fear on the Mission. One of these concerned the appearance of a mysterious tall thin man, dressed in black. People claimed he was knocking on their doors at night and throwing pebbles onto houses. For a time

[6] Compare Marie Reay, "Native Thought in Rural New South Wales", *Oceania*, Vol. XX, No. 2, 1949, pp. 89–118.

they were quite panic stricken, though there was no objective basis to these fears, for thorough searches never revealed any intruder.

One of the Christians on the Mission expressed the attitude to the old ways thus:

" The old aboriginal beliefs are still there, but the old people that carried them out have gone—there's no one to take the place of them old types—there's no one here to do it now, so we're not afraid of them now but say a curlew was to call out there—a shivering goes through every one of us. Who's the message for? They seem to be in you somehow—there's belief in all those rackets, but no one to carry them out ".

Knowledge of the indigenous languages has also declined. Only a few of the older people can still speak their own language, and during ordinary conversations people speak English with an occasional native word interspersed. Among some of the older women there is considerable pride in the fact that they still know some of the language, for it is one of the few remaining links with the past, but no attempt is being made to hand this on to the children. They usually keep their knowledge to themselves for fear of ridicule from other people, who also become suspicious if people say things which they cannot understand, in case they are being insulting.

Some of the words which survive in common use are words for part of the body, for food, for man, women, white-man, policeman, etc.; probably no more than a hundred words would be heard in ordinary use.

Thus the aboriginal or " traditional " orientation of these people is simply an awareness of a common group identity as " black " people and an opposition to the ways of white people. The Mission people think of themselves as differing from white or Upper caste people, because they are not " flash ", nor concerned about saving money. They are what E. Colson in the " Makah Indians " has termed a " self-conscious sub-society " but they no longer possess a distinctive culture.

So long as the white community imposes a caste barrier upon part-Aborigines, one cannot expect much change in these Lower castes, for the fact of being rejected is one of the main determinants of their behaviour. While the caste barrier remains, few of the darker coloured people have any incentive to assimilate themselves, and they prefer to make the best of their lot.

RUTH A. FINK.

BEHAVIOURAL RESPONSES TO DISCRIMINATION. A SUPPLEMENTARY NOTE

By MARIE REAY

MISS FINK[1] has mentioned some of the behavioural alternatives open to a coloured person in the face of " the caste barrier ". I shall try to supplement her remarks about the reactions she observed in " Barwon " township in 1954 with some observations I made in the township of Brewarrina, New South Wales, nine years earlier.

There were three widely separated sections of the coloured population. Some (the " Mission blacks ") lived on the Government Aboriginal Station, nine miles from town. Others (who corresponded to the " Middle Group ") dwelt in shacks and humpies in a riverbank camp, on the outskirts of the area of white settlement and across the Barwon River from the township proper. A handful of households which included persons of partly aboriginal descent were scattered among the white community.

The camp on the riverbank was partly a kind of staging camp where part-Aborigines stayed before moving elsewhere. It was largely made up of people who had left the Aboriginal Station as a result of friction with other residents on the basis of tribal division. (Some years earlier, well-intentioned authorities had brought together remnants of tribes which were strangers to one another, to be co-residents.) But most of the riverbank people, having found their taste of " Mission " life to be not without its bitter flavour, were triumphant at having got away from the " Mission " when local white opinion, as they judged it, wanted " the blacks " to be " classed out nine miles ". Their move to town was, inevitably, no simple expression of incompatibilities and conflict, but also a deliberate rejection of differential treatment.

One of the " behavioural alternatives " for a coloured person, Miss Fink suggests, is " to assert himself actively and to deliberately ignore the existence of the barrier. He may try to prove ' I'm as good as the next man ' . . . ". These are really two quite different alternatives which are mutually exclusive, and we are confusing behavioural responses with responses which are purely verbal if we fail to separate them. The part-Aborigine who asserts aggressively " I'm as good as the next man " rarely tries to prove it by his actions. Expressing his resentment in this manner only serves to harden the barrier. In Brewarrina, this was a common response among the people of the riverbank camp and the " Mission ". It is a reaction which is ruled out for any aboriginal person who intends to live permanently in the midst of the white community. Such an individual cannot afford to assert openly that he is

[1] In the preceding article on " The Caste Barrier ".

" as good as the next man ", though he can implicitly act on that assumption as several part-Aborigines who lived in the township were already doing. They lived as they thought " sober and respectable " (selfrespecting) members of the white community should live. What we might call " equalizing assertions "—verbal responses which deny that status differences accord with other differences—are common among Aborigines who suffer status disavantages.[2]

An " alternative solution " sought by town-dwelling Aborigines in " Barwon " was to form a social clique. Coloured persons who lived in the midst of the white community in Brewarrina township in 1945 did not form a " clique " in the usual sense of the word. What they had in common was not some form of association with one another but, rather, a determination to disassociate themselves from other coloureds including, as far as possible, one another. Each household was, as it were, a spearhead of assimilation. The assimilation they aimed at was individual assimilation, not assimilation of a group. It would be unsurprising to find that during the ensuing near-decade their numbers had increased to an extent which allowed a class structure exactly parallel to that at Moree to develop. The assimilation aims of " Upper Group " Aborigines at " Barwon " in 1954 were evidently still individual ones. " If the occasion had arisen," Miss Fink writes, " and they had seen an opportunity of entering real white social groups, these people would have had no hesitation in cutting themselves completely adrift from their former associates in the 'near-white ' substitute clique."

In Brewarrina in 1945, a partly aboriginal woman who was married to a white man had already " cut adrift ". She ran a boarding-house for white people which was well-appointed by rural standards and noted in the district for its gentle character. Assiduous participation in Church activities enabled her to associate exclusively with white persons of good repute in the community. Perhaps it would not be far-fetched to suggest that the presence of this woman in the otherwise exclusively white community was an important factor in preventing colour prejudice on the part of whites from developing to the same extent as at Walgett and Collarenebri. She went quietly about the business of living as she saw it—caring for a sick husband, cooking meals and keeping her house clean and tidy, taking Communion and growing flowers for Church functions. Always the colour of her skin and her obviously aboriginal features marked her out—not as an object of discrimination, for the people of the township respected her, but as an example of what ' the blacks ' were capable of doing " if they tried ".

MARIE REAY.

[2] M. Reay and G. Sitlington, " Class and Status in a Mixed-Blood Community (Moree, New South Wales) ", *Oceania*, Vol. XVIII, No. 3, 1948, pp. 179–207.

WILD AND EMERGENCY FOODS OF AUSTRALIAN AND TASMANIAN ABORIGINES

By F. R. IRVINE[1]

Thomson[28] states that, contrary to expectation, the main food supply of Australian Aborigines in North Arnhem Land (except at restricted seasons) is vegetable, over 60 food plants being known. A few are staple food plants, gathered by the ton, and provide a regular harvest in the same way as do cultivated crops. In East Arnhem Land the most important plants in this respect are *Djatu* (*Cycas*) fruit, and two or more species of yam (*Dioscorea*). The only aboriginal attempt to store vegetable food, witnessed by Thomson, was on western Cape York Peninsula, where *Parinari*, *Nonda*, and *Buchanania* fruits are preserved. Women, it seems, are mainly responsible for the vegetable food, and men for the animal food. The majority of the vegetable foods are only gathered casually, and locally. Many native fruits occur and are eaten in large quantities, but mostly for short seasons. Vegetable foods are largely lacking during the height of the wet season (January-March).

ROOTS AND UNDERGROUND STEMS

Radicles of Young Plants. In N.Q. there are two (?) species of mangrove, the roots (radicles) of which are edible. Those of *Bruguiera Rheedii* are first baked in ashes for a considerable time; then, the skins removed, they are pounded, and the pulp washed several times, the water being allowed to drain away. Those of another species, *B. gymnorrhiza*, after baking and scraping, are sliced with a small snail-shell knife and finally soaked in water overnight before being eaten ([23], p. 10).

Young roots. The roots of young plants (together with young shoots and leaves) of *Hibiscus heterophyllus* are eaten raw in N.Q. ([23], p. 13), while the roots (and stems) of young plants of *H. ficulneus* are roasted in ashes and eaten in N.Q. and are said to be very nourishing ([21], p. 100).

The long thick roots of young specimens of a thorny tree *Cochlospermum sp.* are roasted in the Mitchell River district (Cape York Peninsula, Q.). The skin then peels off, leaving a delicate white portion of good flavour, which is eaten ([21], p. 86).

The roots of young Acacias (*A. pallida*,[21], p. 94, and *A. Bidwillii*, loc. cit., p. 93) are roasted and eaten in N.Q., those of the latter being first peeled. The bark of the

[1] Of 32 Tavistock Square, London. The author thanks Dr. R. Melville and C. E. Hubbard, both of the Royal Botanic Gardens, Kew, for their help in preparation of this article.

Note: In this article, the following obvious abbreviations for regions are used: C.A., Central Australia; N.A., Northern Australia (in general); N.T., Northern Territory; S.A., South Australia; V., Victoria; N.S.W., New South Wales; N.Q., North Queensland; Q., Queensland; T., Tasmania; W.A., Western Australia. The references in the text are to the bibliography at the end of the article.

young roots of species of Mallee (one of the Myrtaceæ) are pounded, roasted, and eaten in C.A. ([26], p. 58). (The name Mallee is applied to any sp. of *Eucalyptus* of more or less shrubby growth, suckering from the base). The roots and the seeds of *Brachychiton rupestre* (Bottle Tree, [21], p. 104) are eaten in N.Q., also those of *S. trichosiphon* ([23], p.18), the latter raw ([16], p. 60). Added to the list are: *Lavatera plebeia* ([13], p. 159), the fern, *Marattia fraxinea* ([16], p. 41), whose roots and pith contain starch, *Marsdenia Leichhardtiana*, Darbah, Doobah or Carcular ([16], p. 42; [13], p. 160), *Sonchus oleraceus*, Sow Thistle ([16], p. 59), and *Thysanotus exiliflorus*.

Other roots under this head are those of a fresh water rush Yinbun, *i.e.*, Bulrush or Reed Mace (*Typha Muelleri*), eaten raw by the Brisbane tribe, the outer skin being removed and the fibres spat out ([22], p. 92; [26], p. 60). The Tasmanians too, eat bulrush roots, presumably *Typha* ([6], p. 16); and they are also eaten in C.A. ([26], p. 60). In N.Q. raw edible roots include those of *Erythrina vespertilio*, certain *Hibiscus spp.*—*H. divaricatus* (roots peeled and skin eaten raw, [21]. pp. 99–100); another *H. sp.* (roots broken between stones and eaten raw); *H. microchlænus* and *H. rhodopetalum* (roots presumably eaten raw *loc. cit.*).

The yam-like rhizome of *Bowenia spectabilis* is used largely for food ([2] and [16], p. 11). The rootstock is also eaten in the Bloomfield, at Cape Grafton etc., though not at Cooktown ([23], p. 10). The roots of *Brachychiton Gregorii* are chewed in C.A. ([26], p. 56), also for their sap ([12], pp. 330, 331, 337).

The roots of the " Native Carrot " (probably *Didiscus glaucifolius*, *Umbelliferæ*) from the sandhills is sometimes eaten ([12], p. 338). The thick roots of Wadroo ([11], p. 56) can either be eaten raw or cooked in the ashes.

Eaten Roasted. Boerhaavia diffusa roots are roasted and eaten. They are mealy, sweetish, and very nourishing ([21], N.S.W.) ([13], pp. 154, 157, 159, 170). They are also eaten in the Musgrave Range, S.A. ([12], p. 209) (raw ?), and roasted before consumption in N.Q. ([21], p. 95 and [23], p. 10). Combungie or Wangle Plant roots are collected at the Murrumbidgee and Lachlan Rivers, heaped up, covered with fuel then with earth as in an oven, or actually cooked in ovens, before being eaten ([19], pp. 90, 91. Scientific name unknown).

The rootstock of *Dolichos biflorus* is roasted and eaten in N.Q. ([23], p. 12). Those of another leguminous plant, *Eriosema chinense*, are skinned, roasted and eaten, also in N.Q. (*loc. cit.*, p. 12), as are those of *Phaseolus Mungo* (an Australian plant ?—*loc. cit.*, p. 15). The roots of *Vigna lutea* and *V. vexillata* are roasted and eaten in N.Q. ([23], p. 16). *V. lanceolata*, Wodaroo, is a long thin root, sweet and mealy, and one of the best vegetables available to the natives. It is a legume with a thick parsnip-like root which is ash-roasted ([13], pp. 157, 164, 170). Other roots which may be mentioned are: *Erodium cygnorum*, "Ngumilba ", S.A., cooked in ashes ([29], S.A.); *Geranium pilosum*—" Crowfoot " or " Native Carrot " which used to be roasted and eaten ([16], p. 33, A. 11). The roots of *Leschenaultia divaricata* are supposed to be eaten by the Arunta (Aranda) and Luritcha tribes ([26], p. 59). Various roots can be eaten raw or roasted, including: *Typha Muelleri* (see above.—[26], p. 60, C.A.), *Aneilema siliculosum* ([23], p. 9, N.Q.), and *Vigna lanceolata* ([26], p. 57, C.A. and [23], p. 16, N.Q.).

Portulaca intraterranea whose root is only edible when cooked[13]; *Picris hieracioides*, baked until softened, but only chewable; it is neither nutritious nor palatable (Mitchell, [16], p. 52); and finally *Thysanotus exiliflorus*, *T. Patersonii*, and *T. tuberosus*[13]—Poiya, Murgu, etc.—roots eaten, raw or roasted.[14]

The roots of *Tribulus Solandri* ([23], p. 16) and the large tubers of a gourd, *Trichosanthes palmata* ([21], p. 105) are roasted and eaten in N.Q. The roots of *Acacia crassicarpa* are similarly used in Princess Charlotte Bay and Boggy Creek ([23], p. 9).

The rootstock of *Cissus clematidea* is roasted between stones and then eaten (N.Q.), while at Cooktown that of *C. opaca* is roasted and eaten. That of another sp. *Cissus trifolia* is roasted on the ashes lying over heated ant-bed "chunks" or stones. The ashes having been later removed, the roasting roots are covered with a sheet of tea-tree (*Leptospermum sp.*) bark, ashes and sand placed on the top, and the whole left to bake. Before eating, the thick cortical substance on the outside of the root is removed ([23], p. 16).

The rootstock of *Portulaca australis* is roasted and eaten, and that (with the seeds) of *P. napiformis* also eaten in N.Q. ([23], p. 15). The fleshy root of *Calandrinia balonnensis* (Portulaceæ) is eaten raw or cooked ([11], p. 55). The roots (or probably the inner root bark) of *Eucalyptus cæsia* are eaten in the Musgrave Range, S.A. ([12], pp. 331–332). The root bark of *E. dumosa* (Mallee) is stripped off and used as food in the desert ([12], pp. 331–332). The roots of *Psoralia badocana* are eaten in N.Q. after being scraped and roasted ([23], p. 15).

Typha Muelleri has been mentioned—bulrush. Mitchell, quoted by Maiden ([16], p. 64), writes: The roots contain saccharine matter and fibre, are roasted in a hollow in the ground and eaten hot, or taken as provision on hunting expeditions, but they are a miserable apology for flour, though the rhizomes contain much gluten. The "Asparagus of Cossacks" is collected and cooked in much the same way. The ash after drying=9·58% plant (Cf.[21]).

Sometimes roots are hammered as well as being roasted, e.g., *Scirpus littoralis* ([23], p. 15, N.Q.); *Hibiscus brachysiphonius* ([23], p. 13); *Atylosia reticulata* ([23], p. 9); while the rootstock of *Vitis acetosa* is used in this way by the Koko-vermal (?) and Koko-wara (?) Aborigines of N.Q.

The roots of *Sterculia quadrifida* are roasted and eaten ([23], p. 16), as is also the rhizome of a Water Lily—*Nymphæa gigantea* ([23], p. 14). The underground stems of *Tacca pinnatifida* yield a large quantity of white fecula and good flour for confectionery. It resembles arrowroot and is very nutritive. In Arrakan (Burma), starch for the China market was extracted from it ([16], p. 61, Q., N.T.). The tuberous roots of *Aponogeton elongatus* and *A. monostachys* are starchy and of excellent taste ([16], p. 7, N.S.W., Q., N.T.). The root of the Taro of Fiji (*Colocasia antiquorum*) can be cooked (or replanted when its leaves are cut off). Fijians prefer Taro cold, Europeans like it better roasted and hot. Some varieties are better for puddings, some for bread, and some for boiling or baking. These roots, largely consumed in Japan, are known as "Japanese Potatoes". An analysis shows water 85·2%, starch 10·4%, a low

percentage of protein ([16], p. 17, Q.). The roots of *Dioscorea transversa*, which grow among rocks in crevices, are mostly eaten raw, but the larger are roasted. The root bark of *Fusanus persicarium* is used as food all over Australia except T. and Q. ([16], p. 32); and the outer part of the root of *Leschenaultia divaricata* (Mindrie) is cooked and eaten ([13], p. 165).

Tubers and Underground Stems. The large tubers of *Dioscorea bulbifera* var. *elongata* and var. *rotunda* are kept stored in sand in N.Q. Later they are roasted, broken in water, strained through fine bags into troughs of water, and washed. The starch is extracted by straining ([21], pp. 97–98, and [23], pp. 11–12). Those of *D. sativa* are similarly treated.[21] The potato-like tubers of the wild yam *D. transversa*, known to the Brisbane tribe as " Tarm " ([22], p. 93) are used as food in the N.T. ([4], p. 151) and in N.Q. ([21], p. 97). Other authorities writing of its use as food are Mathew ([20], p. 97) and Dunbar ([10], p. 176). According to Thomson, these round yams, known as Gulläkka, are eaten in N. Arnhemland,[28] where *D. sativa* var. *rotunda* (Djitarna), after the poison has been leached out, forms with *D. transversa* two of the main wild foods of N. Arnhemland. The " yam " of *Hardenbergia retusa* is used as food in N.Q., where it is roasted, the skin removed, the " yam " hammered and mixed with water ([23], p. 13). Another " yam ", produced by an Asclepiad—*Ceropegia Cumingiana*, is also eaten there ([23], p. 92 and [11], p. 53). The tubers of another Asclepiad—*Microstemma tuberosum* are eaten there either raw or roasted ([23], p. 14). According to two authorities ([20], p. 92 and [11], p. 53), various kinds of yams are eaten by the Aborigines, the tubers of one " Wobid " being eaten either raw or cooked. A desert yam called " Yala " is eaten by the Wailbri tribe of C.A. ([27], pp. 291, 295, 296).

According to Basedow ([4], p. 151) and Dunbar ([10], p. 176) the corms or tubers of a Water Lily, *Nymphæa gigantea*, are roasted in ashes and eaten in tropical Australia. Their vernacular names are Kepa, Kedje, and Toki. The large tubers of the Blue Water Lily (*N. gigantea*) are roasted and eaten in N.Q. ([21], p. 101) ([23], p. 11). Thomson[28] reports that the rootstocks of waterlilies (with the stems and seeds) form an important article of diet in Arnhemland, especially during the dry season. There too he states: Corms form one of the staple foods. Near the coast they are the most important staple from the onset of the dry season until rains begin. The small round corms are very abundant, covering hundreds of acres, especially those liable to be flooded by brackish water. They are about the size of hazel nuts, and have much the same taste when eaten raw. They are also cooked by roasting on hot ashes, and then hammered with wooden mallets into the form of cakes resembling nut-meal of coarse texture. Plate 9, opp. p. 59 (Thomson) shows women of Blue Mud Bay with yam sticks gathering corms of Tall Spike Rush *Heleocharis* (*eleocharis*) *sphacelata*. J. H. Maiden ([16], p. 35) mentions the native name " Kaya " for this plant, gives the number of tubers to each specimen as 6–12, and gives its area as all Australia except W.A. Thomson[28] states that the corms of the Tall Spike or Mat Rush, known locally as Rakai, form one of the staple foods in Arnhem Land. Hundreds of acres, especially of land liable to be flooded by brackish water, are occupied by this sedge which is very abundant there, near the coast, and provides a most important staple food from

the onset of the dry season till the rains begin. The small round corms, about the size of hazel nuts, have a nutty flavour when eaten raw. They are also cooked by roasting on ashes, then hammered with mallets into the form of cakes of what resembles nut meal of coarse texture. (See remarks on corms, p. 116, above). Edible throughout the whole continent are the tubers of *Caladenia spp.*, the Spider Orchids ([16], p. 11).

The underground stems of various Aroids (Araceæ) are also used as food. These include the stems of *Caladium macrorrhizon*, baked when young in ashes and pounded on a log or stone until the mass is fit to eat (N.Q., [21], p. 95, Cf. 14). Thozet, cited by Maiden, describes the preparation in N.S.W. and Q. of *Colocasia macrorrhiza*, Pitcher etc. The young bulbs and rhizomes are scraped, divided into two, put under hot ashes for half an hour, then pounded between a large and a small stone. Watery pieces are thrown away, the others united by twos and threes and put into the fire again, taken out, pounded into cake, returned to the fire, and occasionally turned. This operation is repeated 8–10 times. When the Hakkim or grey-green colour begins to " harden ", the mass is fit for use ([16], p. 18) (Cf.[23], p. 11). Those of *Colocasia antiquorum* are baked and eaten in N.Q. (*loc. cit.*). The underground stems of *Amorphophallus glabra* (also stems and fruits) are similarly prepared there ([23], p. 9). Those of Conjevoi (*Alocasia macrorrhiza*) are poisonous ; and after being soaked for a long time, are pounded into cakes which are then roasted on cinders, and called Bundal by the Brisbane tribe ([22] p. 92 and [20], p. 92).

The large corms or hard tuberous rhizomes of *Typhonium angustilobium* are pounded and roasted several times over before being used as food in N.Q. ([21], N.S.W., p. 105). Those of *T. Brownii*, if eaten raw, cause a burning sensation, but if roasted for a short time in ashes and pounded—repeating the process until they attain the consistency of indiarubber, they can be eaten ([23], p. 16 N.Q.) They are not watery, but stick together after first roasting ([16], p. 66, N.S.W. and N.A.). The small round tubers of a small water plant, *Limnanthemum crenatum*, are roasted and used as food in N.Q. ([21], p. 100) ; as also those of *L. geminatum* ([23], p. 13). The tubers of certain *Ipomœa spp.*, " Native Yams " are eaten, and the long narrow roots of *I. heterophylla* are also cooked for food. These Ipomœas (Convolvulaceæ) which have underground edible portions include : *I. eriocarpa* and *I. gracilis* (N.Q.), *I. grandiflora* (in hot ashes), *I. pes-capræ* (after being baked and pounded), and *I. uniflora* (after roasting and pounding) ([23], p. 13).

The tubers of various sedges (Cyperaceæ) are used as food. These include *Cyperus rotundus*, Yava, which can be eaten raw or roasted (C.A. and West C.A.). The tubers are first rubbed in the hands to loosen the husks, which are then blown away. The tubers of *C. rotundus* (?) and *C. bulbosus* are similarly used ([23], p. 11 ; [4], pp. 148–149 ; [24], p. 17 ; [26], p. 60 ; [12], p. 335 ; [13], p. 151, 7.). Those of *Heleocharis* (*Eleocharis*) *sphacelata*, already mentioned, are sometimes eaten raw, e.g., on the Pennefather River N.Q. or are thrown into hot ashes, rolled out one at a time, and hammered into one large ball ; or they may be first roasted ([23], p. 13). The rhizome of *Lepisonia mucronata* is eaten there also (*loc. cit.*).

The rounded or spindle-shaped root tubers of Water Ribbons or Giant Arrow Grass, *Triglochin procera*, are baked and eaten in N.Q. ([23], p. 16). Those of *Tacca pinnatifide* on the Bloomfield are baked in ashes, mashed, rolled in ginger leaves, and baked again. On the Morehead and Musgrave Rivers they are cooked in hot ashes like a " damper " after having first been rubbed, put through a sieve, and then washed. Roth (*loc. cit.*) gives various methods of its preparation for food.

The roots, leaf stalks, and seeds of the (Water ?) Lily are cooked and eaten ([25], p. 469 and [15], p. 22). The " tuberous roots " of *Thysanotus Patersonii* (Liliaceæ), are usually eaten raw, but are occasionally cooked (Musgrave Ranges, [12], p. 213) ; and the reddish tubers of " Wandi " (*sp.* ?) are used as food in the Kimberleys ([15], p. 21). " Darling Lily " (*Crinum flaccidum*) bulbs yield fair arrowroot ([16], p. 20, S.A., V., N.S.W., Q.). Mueller says of *Cymbidium canaliculatum* (Orchideæ) that it is the " only orchid of Australia which affords mucilaginous food ".[21] Maiden adds the following to the list of " edibles " : " Yamberin " (*Dendrobium canaliculatum*) bulbous stems, minus old leaves, eaten (Thozet, [16], p. 22, Q.) ; *D. speciosum* " Rock Lily "—pseudo bulbs eaten but contain little nutritive matter ([16], p. 22) ; the sweet small tubers of *Eustrephus latifolius* (p. 30) ; " Native Potato ", *Gastrodia sesamoides*, tubers roasted and eaten by Tasmanian natives, the taste resembling beetroot (*loc. cit.*, p. 32) ; *Hæmorodum spicatum* (*loc. cit.*, p. 34), bulbs eaten by W.A. Aborigines ; the sweet milky tubers tasting like coconut, of *Microseris Forsteri* (p. 45) (all Aust.) ; the " truffles " or " native bread ", *Mylitta australis* (p. 46, V., N.S.W., T.), which should be boiled, but are insipid ; and the tubers of *Portulaca napiformis* (p. 53, Q., N.T.). Cleland and Johnston ([13], p. 152) add *Portulaca oleracea* var. *grandiflora* ; roots eaten after cooking ; and the edible tubers of *Thysanotus tuberosus* ([13], p. 160).

Edible Grubs in Roots

While on the subject of roots, grubs eaten by Aborigines are found in the roots of some plants, e.g.[14] : *Adriana Hookeri* (Kap, Kapi, S.A.) ; *Cassia phyllodina* (Poondi or Boondi, S.A.) ; *Codonocarpus cotinifolius* (Kaloordi, S.A.) ; *Grevillea stenobotrya* (Yeraing) ; and *Zygophyllum ammophyllum* (Uraitja).

Stems

Palms. The " heart " or so-called " cabbage " of the stem of *Livistona humilis* is first pounded and then roasted and eaten at Red Island. On the Pennefather River it is baked in ashes, holes made in it with a stick, water dropped through each hole, and the vegetable then allowed to cool. It is eaten after being beaten up, or it may be put into water, on which it has a sweetening effect, and which is then drunk ([23], p. 14). The whole trunk of this Cabbage Palm is cooked, beaten on a log, and the resulting glutinous product eaten (Murngin tribe, Arnhem Land ([30], p. 144). The Kabi and Wakka tribes of south-eastern Q. eat the core of the top part of the stem ([20], p. 92) ; the gum is " sucked like a lolly " (Morehead River[23], p. 14). Petrie ([22], p. 93) confirms the use of the stem of this palm as food.

The bud and young leaf stalks of the palm *Drymophlæus Normanbyi* are eaten on the Bloomfield ([23], p. 12). In N.Q. the growing point of the palm *Calamus Moti*

is roasted, skinned, and beaten before being eaten (at Atherton), whereas on the Tully it is eaten raw. *Others.* The pith, stem, "roots", and fruit of *Amorphophallus glabra* (see above) are eaten in N.Q. ([23], p. 9) and the stems of *Rhaphidophora Lovellæ* (*loc. cit.*, p. 18) are also eaten in N.Q.

The stems (also the leaves and seeds) of Pigweed or Munyeroo (*Portulaca oleracea*) are eaten in the Musgrave Ranges ([12], pp. 209, 336). The stalks are either consumed raw or roasted in the ashes and then eaten ([21], p. 103, N.A.).

The stem (and root) of young plants of *Hibiscus ficulneus* and the young shoots (leaves and roots) of *H. heterophyllus* have been mentioned already (p. 113) ([24], p. 100 and [23], p. 13). The young buds of *H. divericatus* (and also the roots), and the young buds of the shrub *H. pentaphyllus* are eaten raw, as are also the young buds of the creeper *Ipomœa turpethum* (N.Q.) when the seeds are still white ([23], p. 100).

The coarse stalks of water pepper, *Polygonum hydropiper*, are first roasted, then peeled and eaten by the Aborigines on the Flinders River, N.Q. ([21], p. 103). The young shoots and roots of *Typha Muelleri* (Cf. p. 114) are eaten, raw or roasted, in C.A. ([23], p. 60). The glutinous substance occurring as a thin layer on the inner side of the bark (phlœum or cambium ?) of *Brachychiton Gregorii* (Sterculiaceæ), next to the wood, is used as food only in times of emergency ([12], pp. 330, 331, 337).

Other Young Shoots. The young shoots, "palm cabbage", of Small Lawyer Cane, *Calamus caryotoides*, are eaten both at Cooktown and the Bloomfield ([23], p. 10). Those at the top of a common palm, *Archontophœnix Cunninghamii* are pulled off and eaten raw as a vegetable by a Brisbane tribe ([22], p. 93). The base of the growing shoot of *A. Alexandræ* is eaten in N.Q., raw or roasted ([23], p. 9). The leaf buds of a sedge, *Gahnia psittacorum*, are eaten in N.Q. (*loc. cit.*, p. 13).

Leaves

The leaves of *Portulaca oleracea* (p. 115, above) and those of *Hibiscus heterophyllus* (p. 113) have been referred to already. Those of *Calandrinia balonensis* are eaten either raw or baked on hot ashes ([4], pp. 149–150). The leaves of the Water Pepper, *Polygonum hydropiper* (see p. 9, above) are very hot to the taste (and are edible ? [21], p. 103).

P. hydropiper is an European species, though recorded from S.A. The *sp.* referred to may be another *sp.* of hot-tasting *Polygonum*.

Stenopetalum velutinum is cooked with grass in the Musgrave Ranges by means of hot stones, the leaves being then stripped off and eaten ([12], p. 209); and *Lepidium oxytrichum* is similarly prepared there (*loc. cit.*). All the green parts of the Native Cress, *L. pseudo-ruderale* and other *spp.*, which have a biting, cress-like flavour, are eaten, raw or cooked (hot ashes or stones) in C.A. ([26], p. 55 and [12], p. 55).

The leaves of the Desert Banana or Yubuli (a creeper) are eaten raw, and form with the fruit (Cf. p. 133) an important article of diet for the Wailbri tribe, C.A. ([27], p. 290.) The Sorrel or Sourgrass (probably a *Rumex sp.* or one allied or "Sorrel Grass") is used as food by the Ngemba tribe of western N.S.W. ([10], p. 176) and by the Tasmanians ([6], p. 16).

The following are eaten: the base of the growing shoot (i.e., "cabbage") of the palm *Licuala Muelleri*, in N.Q. ([23], p. 13); the white basal parts of the inner leaves of the young plants of *Livistona Mariæ*, raw or cooked, in C.A. ([26], p. 60); a spinach known as Warrigal Cabbage, i.e., New Zealand Spinach (*Tetragonia expansa*) by the Ngemba tribe in Western N.S.W. ([10], p. 176); and the leaves (also flowers and seeds) of the (unidentified) Willa Creeper, of C.A. ([26], p. 60 and [11], p. 53). The leaves (and pods) of an Asclepiad, *Cynanchum floribundum* (Thootamia in Cloncurry) which are full of "milk" or latex, are eaten raw when young, and are said to be fattening ([21], p. 97).

The white tender basal parts of the inner leaves of the Grass Tree (*Xanthorrhœa Thorntoni*) are eaten raw or roasted in ashes in C.A. ([26], p. 59) and in T. ([6], p. 67). Backhouse gives *Xanthorrhœa spp.*, and that these parts have a nutty taste ([16], p. 67). Palmer ([21], p. 105) adds the young leaf shoots of *X. arborea*.

Infusions. From the sweet exudation from the leaves of a Mallee (*Eucalyptus dumosa*) a liquor is made by the Aborigines of the Wimmera ([31], p. 73). The burr *Acæna sanguisorbæ* is a tea substitute by early colonists in all Australia except W.A. ([16], p. 4); and the leaves of *Correa alba* are similarly used by sealers in Bass Straits ([16], p. 20). Captain Cook's crew are said to have made tea from the leaves of the Tea Tree, *Leptospermum scoparium*; and to have used them, together with equal quantities of spruce leaves, to brew beer to correct astringency. The infusion, however, is too aromatic for European taste ([16], p. 38, All exc. W.A.). The leaves of the White Myrtle, *Myrtus acmenioides*, are used in Q. and N.S.W. to flavour tea ([16], p. 47).

Other Acidic. The foliage of the Shingle Oak, *Casuarina stricta*, chewed for severe thirst, has an acid closely allied to citric acid ([16], p. 15. All Austr. exc. W.A. and Q.). That of *Muehlenbeckia adpressa* tastes like sorrel ([16], p. 46, ex. Q.); and the Clover Sorrel, *Oxalis corniculata*, has acidulous leaves eaten by natives ([16], p. 50).

Various. Quoted from Maiden:—*Amaranthus viridis*—subst. for cabbage or spinach ([16], p. 6). *Apium australe*, Australian Celery—used as a culinary vegetable (Mueller, [16], p. 9). *Astelia alpinia*—bases of leaves eaten ([16], p. 8) *Atriplex cinerea*—once used as pot herb in N.S.W.; Leichhardt used a *sp.* of *Atriplex* as a vegetable successfully ([16], p. 9). *Cardamine hirsuta* (Ladysmock in England)—good pot herb when luxuriant and flaccid ([16], p. 13. Throughout Austr.). *Cardiospermum halicacabum* (Heart Seed, Balloon Vine) used as a vegetable in Moluccas ([16], p. 13, Q., N.A.). *Chenopodium auricomum* (Saltbush) leaves are put in boiling water to bleach, then cooked as spinach, but are more refined in flavour. The leaves can be gathered every 8 days ([16], p. 15. All exc. T. and W.A.). Australian Spinach or "Fat Hen", *C. murale*, pot herb, may be prepared in the same way ([16], p. 16). *Colocasia antiquorum*, cultivated in most tropical countries for it leaves, is acrid when raw, but may be eaten as spinach on boiling, if water changed ([16], p. 17, Q.). *Drimys lanceolata*? Pepper Tree, leaves are hot, and have biting cinnamon flavour ([16], p. 23, T., V., N.S.W.). *Eucalyptus gummifera*, Bloodwood, mellitose manna on leaves where

pierced by beetle *Anophlognatus cereus* ([16], p. 24, N.S.W., Q.). *Mesembryanthemum æquilaterale*, leaves baked and can be eaten with meat as a salt substitute ([16], p. 44, Grampians). *Nasturtium palustre*, a good pot herb when luxuriant and flaccid ([16], p. 47. All exc. W.A.). *Ocimum sanctum*, Bulla-bulla, pot herb. A variety in N.T. smells like anise, in the East like cloves ([16], p. 48, Q., N.T.). *Pandanus odoratissimus*; tender white base of leaves eaten raw or boiled; eaten in times of scarcity in India[30] ([16], p. 50, Tropical Australia). *P. pedunculatus*, Screw Pine, mucilaginous young parts of leaves eaten ([16], p. 50, N.S.W., Q.). *Rhagodia parabolica*, Salt Bush; 2 oz. of salt are obtained from boiling 2 lbs. of leaves, but after boiling for a further few minutes in a second water, and for an hour in a third, the leaves form a tender vegetable like spinach ([16], p. 55, S.A., N.S.W., Q.). Maiden suggests that a vegetable might be made of the Native Cabbage, *Scævola koenigii* ([16], p. 56, N.T., Q.). The fleshy leaves of *Suæda australis* are used for pickling ([16], p. 61). Mueller suggests the cultivation of *Tetragonia implexicoma* for spinach ([16], p. 63, All exc. Q.); and Mitchell (*loc. cit.*) says that *Trigonella suavissima* can be boiled as a tender vegetable of good flavour. Johnston and Cleland ([13], p. 154) add that all its upper parts are eaten raw, and in large quantities when cooked (All Australia exc. T. and Q.).

These two authors also list: *Bulbine semibarbata*, leaves eaten after cooking ([13], p. 152); *Marsdenia australis*, everywhere except T. (p.160); *Portulaca intraterranea*, all parts above ground raw or cooked; and *Tetragonia expansa*, Paldroo, eaten raw and as spinach (pp. 153, 160, 170).

Palmer [21] gives: *Ammannia multiflora* (Lythariæ), Jerry-Jerry, a small annual a few inches high, erect, branched, grows among grass, and has numerous small red seeds: the whole plant is gathered, trampled on the ground to separate the woody parts, winnowed, ground up in water on flat stones, and then baked as cake; *Caladium macrorrhizon*, whose large sagittate leaves are hot to the taste; and a further note on *Typha Muelleri*, Bulrush, Cat's Tail, or Reed Mace, the young leaves and shoots of which are eaten like asparagus.

Johnston and Cleland[13 14] give the Native Pear *Marsdenia australis*, a creeper whose leaves are eaten; and numerous authors add *Duboisia Hopwoodi*, Pitchuri or Pityuri, a narcotic plant, first chewed, then mixed with wood ashes and a leaf of the plant Kombaru, baked and mixed with Wirra, usually chewed like tobacco.

Flowers

Some flowers are eaten apparently for their own flavour, others used for the nectar they produce, though it is difficult to distinguish between the two classes. In the first we many place *Marsdenia australis*, Native Pear, flowers and flower buds eaten ([13], p. 165) and *M. australis* F.v.M., Doobah, flowers eaten ([16], p. 42). Both these, however, are classed as famine foods; and the stems of the former are also eaten at such times. The flowers and buds of *Dæmia Kempeana* are consumed in the Musgrave Hills ([12], p. 332), and in C.A. the flowers, leaves and seeds of the (unidentified) Willa Creeper of C.A. ([11], p. 53).

The blossoms of the following plants are useful to the Aborigines because of the nectar produced. Those regarded as famine foods are indicated by the letters (FF): *Banksia spp.* (Proteaceæ) ([16], p. 10, FF.) flowers in full bloom contain a sweet honey-like liquid, eagerly sucked out by Aborigines throughout Australia; a large puddle forms underneath cultivated plants, drowning intoxicated bees and wasps. The liquid can cause headache and a feeling of nausea. Roth ([23], p. 9) mentions that the blossoms of *B. dentala* are broken off by the Cape Bedford blacks and put into water which soaks out the copious nectar and is drunk before fermentation sets in. Honey is also sucked from the flowers of *B. marginata*.[21] Among the Leguminosæ, *Bauhinia Carronii* flowers produce a clear nectar which may be squeezed out and sucked, or the blooms steeped in water to make a drink ([21], p. 95). Johnston and Cleland[13] add that these blooms are also pounded in a coolamon, the liquid strained into another vessel, mixed with "honey" from the "sugar-bag" or Honey Ant, and the mixture allowed to ferment for 8–10 days; the result is a semi-intoxicating liquor. An edible sap is also obtained from this Bean Tree (see Famine Foods, below). The following six plants, though classed as Famine Foods may appropriately be given here instead: An *Eremophila sp.*;[14] *Leptospermum coriaceum*;[14] and *Telopia speciosissima* R. Br. ([16], p. 62), blossoms sucked for nectar; *Grevillea Kennedyana* F.v.M. ([16], p. 34), "honey" shaken from flowers and collected; *Hakea Lorea* R. Br. ([16], p. 34), flowers rich in thick brown honey-like liquid, running along the twigs; and *Lambertia formosa* Smith. Honey Flower or Honeysuckle ([16], p. 37, N.S.W., W.A.) flowers contain large amount of honey-like fluid, sometimes covering twigs. The liquid in quantity produces nausea and headache.

Fruits

I. Eaten Raw, or Method of Preparation Not Given.

Acacia brachystachya, Mulga Apples, caused by *Hymenopteron*, eaten raw.[14]
A. holoserica, at Cooktown and Cape Bedford ([23], p. 8).
A. ligulata, Kakura, a bush with edible fruits ([13], p. 161).

Achras sp., in N.Q. ([23], p. 9).
A. australis, very large plum, insipid, ([16], p. 4, N.S.W., Q.).

Adansonia Gregorii, Sour Gourd, dry, acidulous pulp of fruit eaten—agreeable taste like cream of tartar, peculiarly refreshing; consists of gum, starch, sugary matter, and malic acid hardly to be distinguished from Baobab of Africa, *A. digitata* ([16], p. 4).

Aleurites moluccana, Candle Nut Tree, similar to walnut, very wholesome, rich in oil[21] (see also B.).

Amomum Dallachyi, N.Q. ([23], p. 9).

Antidesma Bunius, Bloomfield Cherry; crushed and eaten raw (*loc. cit.*, see also B.).
A. Dallachyanum, (*loc.cit.*, see also B.).

Araucaria Bidwillii, nuts eaten; larger crop every three years.[21]

Astelia alpina, a sweet fruit ([16], p. 8, T., V., N.S.W.).

Astroloma humifusum, Ground Berry, Native Gooseberry (T.) ; fruit is edible, viscid, sweetish pulp, large stone ([16](?), All exc. Q.), *A. humifusa*, also *A. pinifolia*.

Barringtonia Careya=Careya australis, fruit large, calyx attached ; eaten when ripe ([21], pp. 94–95).

B. racemosa, ([23], p. 10).

Berries : Wild strawberries and raspberries, including Dubbul, eaten by Brisbane tribes ([22], p. 94).

Billardiera scandens (Pittosporaceæ), Apple Berry ; berries acid and pleasant when fully ripe, called dumplings by children ; when unripe, a little juice produced disagreeable and persistent heartburn ([16], p. 10. All exc. W.A., and [6], p. 17, T.).

B. cymosa, ([12], p. 329. Musgrave Ranges).

Brachychiton Garrawayæ, fruit eaten ([23], p. 18).

Calamus curyotoides, Small Lawyer Cane ; berries eaten at Atherton ([23], p. 10) (see B (*a*), p. 27, for *C.A.*).

Calophyllum inophyllum, fruit edible ; £10 fine for injuring this or coconut tree ([16], p. 12, Q.).

Canthium oleifolium, Wild Lemon, eaten by Ngemba tribe ([10], p. 175, N.S.W.).

C. lucidium, eaten raw, Red Island ([23], p. 10).

Capparis canescens, fruit eaten raw ; pulpy part good substitute for mustard ([16], p. 12 and [23], p. 10).

C. humistrata ([23], p. 10).

C. lasiantha ([23], p. 10) and Macdonald Downs, C.A. ([8], p. 37 and [21], p. 95).

C. lucida, ([23], p. 10) fruit drooping ; eaten when ripe ([21], p. 95).

C. Mitchelli, Native Orange, Native or Large Pomegranate, fruit 2–3 inches diam. with rough outer rind ; eaten raw when ripe ([21], p. 93–113, Q. and N.S.W.) ; pulp edible, agreeable perfume ([16], p. 12, all states exc. T. and W.A. ; [23], p. 10 ; [26], p. 55), Ngemba tribe ([10], p. 175), Wailbri tribe ([27], p. 290, C.A.).

C. nobilis, fruit edible ([16], p. 13, N.S.W. and Q. ; [23], p. 10).

C. ornans, ([23], p. 10, N.Q.).

C. spinosa, fruit yellow, larger than pigeon's egg, eaten raw ; found round stockyards, sheepyards etc. ([21], pp. 93–113, N.S.W. ; var. *nummuralia* [23], p. 10).

C. umbonata ([23], p. 10).

Carallia integerrima ([21], p. 10).

Cargillia australis, Black Plum, fruit edible ([16] p. 14, N.S.W., Q.).

Carissa Brownii, same as Konkle Berries of C.A. ([27], p. 290) ; also in Kimberley ([15], p. 21) ; N.Q. ([21], p. 96 ; [15], p. 21).

C. ovata, eaten raw in N.Q. ([23], p. 10) ; fruit agreeable, wholesome, with viscid milky juice and a few woody seeds ([16], p. 14, S.A., N.S.W., Q. ; [23], p. 10).

Casuarina decaisneana, Desert Oak ; young sub-acid cones eaten in C.A. ([26], p. 65).

Chilocarpus australis ([23], p. 10, N.Q.).

Citrus australis ([16], p. 16 ; [2], p. 395).

C. inodom, used in place of lemons ([23], p. 395).

Clerodendrum inerme ([23], p. 10, N.Q.).

Coprosma quadrifida, 50 years previously made into puddings in T., but size and number of seeds objectionable ([16], p. 19, T., V.).

C. hirtella, fruit sweet, eatable but unpleasant (*loc. cit.* All exc. T. and W.A.).

Corda myxa, Sebestan Plum of India ; tender young fruits used as vegetable and in pickles ; ripe fruit eaten ; kernels eaten, taste like filbert ([16], p. 19, Q.).

Cucumis acida, fruit small cucumber, dark, smooth, ripens after wet season ([21], N.S.W., pp. 93–113 ; also as *C. pubescens*, below ; [21], pp. 96–97 ; [23], p. 11).

C. melo, Binjy-binjy of Cloncurry ; small wild melon in grass on plains, walnut sized, stripped ; eaten raw ; very common after wet season ([21], N.S.W., pp. 93–113 ; Cf. [21], p. 96, N.Q. ; also C.A., [26], p. 58).

C. pubescens, fruit $1\frac{1}{2}'' \times \frac{1}{2}''$–$\frac{3}{4}''$, speckled pale green and white or striped ; natives roll it on ground to free from hairs, bite off one end, press contents into mouth and throw away bitter rind ([21], pp. 96–97 ; [23], p. 11).

C. trigonus (=*C. Melo* var. *agrestis*) ; eaten raw, N.Q. ([21], p. 96 ; [13], pp. 152, 159, 165).

Cynanchum floribundum ; pods (and leaves) eaten, N.Q. ([21], p. 97).

Davidsonia pruriens, N.Q. ([23], p. 11 ; also in II, below).

Drimys lanceolata, Pepper Tree ; drupe used as pepper substitute ([16], p. 23, T., V., N.S.W.).

Elæagnus latifolia, fruit eaten in India, acid, astringent ([16], p. 24, Q. ; also in II ; [23], p. 11).

Elæocarpus grandis, ripe fruits crushed, mixed with water, made into a paste, and eaten raw ; Broomfield River, N.Q. ([23], p. 12).

Elettaria Scottiana, Wild Ginger ; eaten raw, N.Q. ([23], p. 12).

Enchylæna tomentosa, Currant Bush ; red edible berries eaten raw ([21], p. 98 ; [13], pp. 151, 153, 170).

Erodium cygnorum, eaten raw ([13], pp. 159, 170).

Eucarya acuminata, Sweet Quandong-favorite of Aborigines, of emus ; edible fruits, indigenous to south-east A. ; kernel of ripe fruit eaten[14] ; also in II ([13], p. 150).

Eugenia spp., Roth ([23], pp. 12–13) gives the following as eaten raw in N.Q.: *E. carissoides*, *E. cormiflora*, *E. Hislopia*, *E. Kuranda*, *E. Leptantha* and *E. suborbicularis* (see also II for this, and [21], p. 98).

E. suborbicularis is a large red fruit with a stone, and is eaten when ripe[21]. Maiden adds *E. jambolana* and *E. Smithii*, Lilly-pilly, fruits acidulous and wholesome ([16], pp. 28–29) ; and Bailey mentions *E. Johnsonii* ([2], p. 396). Several other Eugenias, used mainly for preserves, are given in B. *E. uniflora*, edible when ripe, is grown in gardens ([2], p. 397).

Eupomata laurina, in Roth's Queensland list above.

Exocarpus cupressiformis and *E. latifolia*, Native Cherry, latter also called " Scrub Sandalwood ", edible fruit seated on a large succulent pedicel ([23], p. 13; [16], p. 30).

Fenzelia obtusa ([23], p. 13).

Ficus spp., Wild Fig; larger kind called Ngoa-nga, smaller Nyuta; eaten raw by Brisbane tribe ([22], p. 94), and by Wailbri tribe, C.A., where called Wijirrk ([27], p. 290). Roth ([23], p. 83, N.Q.) lists the following species: *F. aspera*, small fig tree, rough leaves (hence Rough-leaved Fig) and small black fruits in large quantities[21]; F. *colossea*, *F. Cunninghamii*, *F. ehretioides*, *F. esmeralda*, *F. eugenioides*, *F. fasciculata*, *F. glomerata* (see also II), *F. hispida*, *F. nitida*, *F. opposita*, *F. orbicularis*, *F. retusa*, *F. stenocarpa*, *F. Thynneana*; also *F. Vesca*, of which Palmer[21] states: fruit pink, reddish, clusters from trunk and largest branches. The same writer mentions a *Ficus* species, Coomey or Orbolo tree, 20 feet high, shady, with edible fruits, and *F. platypoda*, but Maiden ([16], p. 31) questions the edibility of the latter's fruit. Another edible species, *F. gracilipes*, is given by Bailey[2].

Fluggea microcarpa, sweet white fruits collected in large quantities, October-December, in Arnhem Land, and eaten.[28]

F. obovata, crushed and eaten in N.Q. ([23], p. 13).

Ganophyllum falcatum ([23], p. 13).

Gaultheria antipoda, fruit of superior flavour ([16], p. 32, T.).

G. hispida, fruit edible, slightly bitter, and acid (*loc. cit.* T., V., N.S.W.).

Grevillea annulifera, fruits edible(?), W.A. ([16], p. 33).

Grewia polygama, Emu Berries, Plain Currant or Karoom; eaten raw in N.Q.; smooth dry reddish or brown berries ([23], p. 13).[21]

Hovea longipes, young pods eaten by Q. Aborigines (P. C. O'Shanesy, N.S.W., Q.,[16], p.36).

Ixora timorensis ([23], p. 13, N.Q.).

Leucopogon Richei, Carrotwood; barely edible berries reputed to have saved the life of Riche, French botanist ([16], p. 39. All Aust.).

Lissanthe montana, white transparent fleshy fruits edible ([16], p. 39, T., V., N.S.W.)

L. sapida, Native Gooseberry; edible fruit with flesh like Siberian Crab (*loc. cit.*).

L. strigosa, berries edible (*loc. cit.* All exc. W.A.).

Loranthus spp., the berries of the following species are eaten raw: *L. exocarpus* and *L. linophyllus* ([23], p. 37; [14], [26], p. 58; [21], p. 100; [13], p. 160); *L. longiflorus* ([21], p. 100); *L. miracularis* var. *Boormani*, Barraka-barraka, a parasite on sandalwood[14]; *L. Mitchellianus* Koontarola ([13], p. 153); *L. pendulus* (refs. as for first pair); and *L. quandong*, Yappee mulgatoe ([13], p. 160).

Lucuma galactoxylon, green fruit buried for a few days and eaten uncooked; *L. sericea*, eaten raw ([23], p. 14, Q.).

Lycium australe, fruit eaten ([13], p. 160).

Maba humilis, Thankoin, Mogiore (Cloncurry); oval yellow fruit, eaten raw;[21] *M. laurina*, palm-like fruit edible ([16], p. 40, Q.).

Macadamia ternifolia, Queensland Nut, Kindal-kindal, nutritious nut eaten also by Europeans ([16], p. 40, northern N.S.W., Q.).

Macrozamia Miquelii, Dwarf Zamia, Banga; fruit similar to pineapple ([16], p. 41), on stony ridges, few feet high ([21], N.S.W.).

M. spiralis, Burrawang Nut; arrowroot obtained from edible nuts ([16], p. 41, N.S.W., Q.).

Marlea vitiensis, Muak Tree; fruit edible ([16] p. 41, N.S.W., Q.).

Marsdenia Leichhardtiana, Doubah, Carculoir; milky, unripe fruits, edible, better roasted ([16], p. 42; also C.A., [26], p. 59), Also in Mulga country of Flinders Ranges And C.A. ([4], p. 152). The young pods and young shoots of seedlings of *M. australis* are eaten in the Macdonald Downs, C.A. ([21], p. 100).

Melastoma malabathricum ([23], p. 14).

Melodorum Leichhardtii, fruit edible raw ([16], p. 42, N.S.W., Q.; [23], p. 14).

Melothria maderaspatana, C.A. ([26], p. 58, and [13], p. 160), Wella-lilola.

Mesembryanthemum spp., Canagong, T., ([6], p. 16).

M. æquilaterale, Pig faces, Karkulla, Katwort, Berudur, edible fig-like fruit ([13], p. 158; [16], p. 44).

Mimusops Brownia, fruit edible ([16], p. 15, Q.).

M. parvivolia ([23], p. 14).

Morinda citrifolia, Canary wood, Indian Mulberry; edible but bitter flavour and granulated; Q., N.T. ([16], p. 45; [23], p. 14).

Musa spp., Banana, N.Q. ([23], p. 14).

Myoporum Dampieri, Drupes, C.A. ([26], p. 59).

M. debile, Amulla; fruit eaten by Aborigines but slightly bitter; N.S.W., Q. ([16], p. 45).

M. serratum, Blue-berry tree, Native Currant, Myrtle or Juniper, Cockatoo bush; berries edible but salt and bitter ([16], p. 47. All exc. Q.).

Myrsine crassifolia, eaten by Brisbane tribe ([22], p. 94).

Nitraria Schoberi, Karambi, fruit of agreeable flavour ([16], p. 48. All exc. T., Q.).

Owenia acidula, Colane tree, Sour Plum, Native Peach or Nectarine, Gum or Gruie or Morley Apple; sub-acid raw fruit relieves thirst; Q., N.S.Q., S.A. ([21], [16], p. 49; [10], p. 175).

O. cerasifera, very acid fruit, more palatable after keeping or burying in sand for a day or two; Q. ([16], p. 49; [23], p. 14).

Pandanus spp., kernels extracted, some laboriously, and eaten ([7], see also B).

P. acquaticus, nut kernels eaten[21].

P. odoratissimus, Screw Pine; lower yellow pulpy part of drupes eaten in scarcity in India (*Encyclop. of India*). Also in N.A. (Cf p. 32; [16], p. 50).

P. pedunculatus, Screw Pine, Bread Fruit, kernels ([16], p. 50, N.S.W., Q..).

Parinarium Nonda, Nonda; edible fruits like astringent, mealy potato; N.Q. ([16], p. 51; [21], p. 102); cf. [14] eaten raw, also stored in deep holes in dry sand, then pounded and soaked in water;[28] eaten by emus.

Passiflora fœtida, recently introduced(?); N.Q. ([23], p. 14).

Persoonia spp., Geebung; fruits edible, mucilaginous, insipid, slightly astringent ([16], p. 51).

P. falcata, Nauchu, Booral; green fruit eaten raw ([21], N.S.W.; [21], p. 102; [22], p. 93).

Physalis minima, Neengwan (Cloncurry), native gooseberry; fruit eaten N.S.W., Q., N.A. ([16], p. 52; [21], p. 103).

Pimelea microcephala, Willparee; berries edible ([13], p. 160).

Piper Rothiana, fruit eaten raw, Atherton, N.Q. ([23], p. 15).

Pipturus argenteus, Native Mulberry, Kan-gan-gu; berries eaten by Aborigines; N.S.W., Q. ([16], p. 52).

P. propinquus, N.Q. ([23], p. 15).

Plectronia barbata and *P. odorata*, (*loc. cit.*).

Pleiogynium Solandri, Burdeken Plum, (*loc. cit.*).

Podocarpus andina, berries eaten by inhabitants of Chili; somewhat like cherries ([5], p. 599).

P. elata, astringent fruits, flavour aromatic and resinous, eaten mainly by children (*loc. cit.* and [23], p. 15).

Polyalthia nitidissima ([23], p. 15).

Psychotria Simmondsiana (*loc. cit.*).

Randia Fitzalani (*loc. cit.*, also B).

Rhagodia nutans and *R. spinescens*, small berries probably eaten by C.A. natives ([26], p. 57).

Rhamnella vitiensis, Mursilara; edible berries ([16], p. 55, Q., N.Q., [23], p. 11).

Rhodomyrtus macrocarpa, Finger berry, Native Loquat; edible ([2], p. 397).

Rubus Gunnianus, Native (?) Raspberry; best native fruit in T. ([16], p. 55).

R. rosæfolius, Native Raspberry, Naram; granular fruits, insipid, mawkish, slightly astringent (*loc. cit.* [23], p. 15).

Sambucus Gaudichaudiana, Native Elderberry; fruit edible, fleshy, sweetish ([16], p. 56).

Santalum lanceolatum, plum-like fruit, very agreeable, black or brown ([21], see also II). Sometimes eaten raw.

Sarcocephalus Leichhardtii, (cordatus) Leichhardt Tree, Coobiaby (Cloncurry), Oolpanje (R. Mitchell); eaten raw ([21], p. 103; [23], p. 15, N.Q.).

Scævola spinescens, Poorntoo; berries eaten ([13], p. 160).

Schmidelia serrata, ripe berries eaten in India ([16], p. 57, Q., N.A.; [23], p. 15).

Securinega obovata, fruit eaten raw ([21], p. 104, N.S.W., Q.).

Sideroxylon Brownlessianum, N.Q. ([23], p. 15).

Siphonodon pendulum, N.Q. ([23], p. 15).

Solanum aviculare, Kangaroo Apple, Gunyang, Koonyang; fruits only edible after bursting; before, acrid and cause burning sensation ([16], p. 58; see also II*a*).

S. ellipticum, Native Gooseberry; berries eaten ([14], [13], pp. 158, 160).

S. esuriale, Yak-ka-berry, Comya, Oon-doroo; berries eaten by native guides of Sir T. Mitchell ([16], p. 58); ripe berries eaten ([13], pp. 150, 152). All exc. T. and W.A., see II*a*, p. 27, for *S. hystrix*.

S. simile, Quena; eaten in quantity causes sickness; must fall to ground before eaten; causes burning in mouth; scent like strawberries ([16], p. 59. All exc. T. and Q.).

Sollya heterophylla, Gurnu, Hampton Plains ([12], p. 329).

Spondias pleiogyna, Sweet Plum; eaten raw ([21], p. 102).

Sterculia quadrifida, Kurrajong, Calool; mucilaginous substance of unripe fruit edible ([16], p. 59, N.S.W., Q., N.A.).

Styphelia adscendens, fruit edible ([16], p. 61, S.A., V., N.S.W., T.).

S. triflora, Five Corners; fruit edible, sweetish pulp, large stone (*loc. cit.* N.S.W., Q.).

Terminalia Catappa, kernels eaten raw ([23], p. 16).

T. microcarpa (*loc. cit.*).

T. oblongata, Yananolen; Q. (*loc. cit.* and [16], p. 62).

T. platycarpa (?) *platyptera*, small ripe blue fruits, eaten raw; N.Q. ([21], p. 104).

T. platyphylla, Durin (Flinders); fruit eaten raw (also *T. spp.*).[21]

T. sericocarpa ([23], p. 16).

Timonius rumphii, Kavor-kavor; edible fruit resembles European crab apple. Aborigines fond of it ([16], p. 63, Q., N.A.).

Vigna lanceolata, Wodaroo; some pods from buried flowers resemble peanuts (O'Shanesy, [16], p. 66, S.A., N.S.W., Q., N.T., W.A.).

Vitex glabatra, Wundau; edible fruit; good harvest for short season, also eaten by emus which are stalked near them ([28], [23], p. 16).

Ximenia americana, South Sea Islanders very fond of fruit, which before being ripe have a strong smell of almonds ([16], p. 68; [23], p. 16).

Yau-wulyuru, berries, including seeds, eaten by Wailbri Tribe, C.A. ([27], p. 290).

Zizyphus œnoplia, fruit eaten in India; pleasantly acid, mice fond of it (*Cyclopædia of India*; and [16]).

Z. jujuba, Jujube tree (India), Balyan; dessert fruit in China in many varieties; much cultivated in India ([16], p. 68; [23], p. 16).

II. Fruits Cooked or Used in Preserves.

Acacia Farnesiana, pods round, 2″ long, roasted.[14]

A. longifolia, (Sophoræ) Boobyala (T.); pods roasted when ripening ([16], p. 4. All exc. W.A.).

A. sp., Banguna, Desert Acacia; pods form staple desert food, seeds roasted and ground, water added before eaten; Wailbri tribe, C.A. ([27], p. 291). See also I.

Acronychia acidula, sharply acid fruit, used for preserves ([2] p. 395).

A. imperforata, used for jam (*loc. cit.*).

Albizzia monilifera, Mollar ; pods several inches long, roasted when young and eaten ([21], p. 94, N.S.W., N.Q.).

Aleurites moluccana, Candle Nut tree ; fruit roasted in slow fire till it cracks ; kernel then eaten. Cooktown and Boggy Creek ; N.Q. ([23], p. 9 ; Cf. [16], p. 5).

Antidesma bunius, known in Europe and in Java ; used for jams and jellies ([2], p. 395).

A. Dallachyanum, similarly used, like red currant ; Herbert River Cherry ([2], p. 395 ; Cf. A., p. 14).

A. erostre, used for jams and jellies (*loc. cit.*).

A. ghæsembilla, used for jams and jellies (*loc. cit.*).

A. parvifolium, Currant Bush ; used for preserves.

Atalantia glauca, Native Kumquat ; globular fruit ½″ diam. ; acid juice makes good beverage ; fair preserve may be made ; used for jam (*loc. cit.* [16], p. 8, N.S.W. Q.).

Avicennia officinalis, Mangrove ; Aborigines of Cleveland Bay dig a hole in the ground wherein they light a good fire. This, when hot enough, they cover with stones, which, when sufficiently heated, are arranged horizontally at the bottom, the Egaie fruit laid on them, sprinkled with a little water, and covered over with bark. Earth is then placed over the whole to prevent too free evaporation of steam. During the two hours needed for baking they prepare another hole in the sand. In this the softening Egaie is transferred, and water twice poured over it. The Midamo is now fit for eating. The Aborigines resort to this sort of food during the wet season when precluded from searching for any other ([16], p. 9). Obtained in salt water estuaries, all coasts.

Roth's account ([23], p. 9) slightly differs : The fruit is roasted in ashes, covered with tea-tree bark and baked, then sieved in dhilly bag, washed and dried, the " mush " poured into a piece of bark, and eaten.

A. tomentosa, fruit baked or steamed in hollows made in ground and used for fires, then removed, soaked, and baked in ashes ([21], p. 94, N.Q.).

Buchanania arborescens, Little Gooseberry ; unripe fruit gathered and boiled, imparted and agreeable acidity to water, and itself tasted tolerably well ; when ripe becomes sweet and pulpy like gooseberries with thinner rind ; much esteemed by natives (Leichhardt ; [16], p. 11).

B. Muelleri, fruits harvested in quantity in wet season (Jan.–Febr. ; Q.) ; sometimes dried like prunes and called Bindjitj, then rubbed with red ochre and dried till hard and brittle, wrapped neatly in tea tree bark and stored for weeks or months ; fruits (with seeds) later pounded with stones, kept wet during the process ; dried fruit also soaked in water, or mixed with pulverised flesh and bones of the Red Kangaroo (Karrit jambol) into a kind of paste which is greatly relished.[28]

Castanospermum australe, seeds soaked in water for 8–10 days, dried, roasted, and pounded ([16], p. 14, N.A., N.S.W., Q.).

Citrus australasica, Finger Lime ; used for preserves.[2]
C. inodora, used in place of lemons.[2]

Coprosma quadrifida, fifty years previously made into puddings in T., but size and number of seeds objectionable ([16], p. 19, T., V.).

Cycas media, Nut Palm ; crown of round smooth ruts, size of walnuts, at base of leaves, nuts (along with those of other *Cycas* spp., [29], p. 144) afford much food in Arnhem Land, but need soaking for 3–5 days to leach out the soluble poison ; it is broken up, dried, and put into a bag in the water, next pounded and roasted several times in ashes, having been moulded into a large cake weighing probably several pounds, and wrapped in a neat parcel of paper bark ; it now resembles very heavy and coarse unleavened bread ; considerable quantities collected during year and will keep after preparation for several days or weeks ; used also as a ritual food ([21], [16], p. 21, 28 ; see also II*a*). The Brisbane tribe also crack, soak and wash the nuts ([23], p. 11 ; [22], p. 93 ; [19], p. 21, 89, 97).

Davidsonia pruriens, used for jam and jelly, hairs having been rubbed off first with rough cloth ([2], p. 396).

Desert Banana, Yubuli ; young pods eaten whole, raw or cooked ; ripe pods cooked ; an important desert food, Wailbri tribe, C.A. ([27], p. 290).

Desert Plum, Sandalwood, Mugagi or Moiyu ; eaten by Wailbri tribe, C.A. (*loc. cit.*).

Desert Raisin, Gararrba ; berries an important desert food, Wailbri (*loc. cit.*).

Desert Tomato, Wonugidji ; flesh, without seeds, edible ; seeds removed ; fruit dried and strung on sticks ; soaked before use. An important desert food, Wailbri (*loc. cit.*).

Diploglottis Cunninghamii, Tamarind Tree, Burrunedra ; pleasant sub-acid fruit used for preserves ([2], p. 396 ; [16], p. 23 ; N.S.W., S.Q.).
D. diphyllostegia, made into jams and jellies ([2], p. 396).

Dodonea spp., yeast and beer prepared from fruit ([16], p. 23. All Austr.).

Drimys lanceolata, Pepper tree ; drupe used as pepper substitute (*loc. cit.*) T., V., N.S.W.).

Elæagnus latifolia, fruit eaten in India ; acid, astringent ; makes good tarts ([16], p. 24, Q.).

Enhalus Kœnigii, fruits roasted and eaten ; Cape Bedford, at low tide ([23], p. 12).

Entada scandens, beans roasted, baked, pounded, left 10–12 hours in water, then eaten.[21]

Eucarya acuminata, Native Peach, Quandong ; fleshy pericarp makes excellent sub-acid preserve and jelly (Cf. black guava) ; stones extracted and fruit dried in sun and used when convenient ; kernel also edible ([16], p. 31. All exc. Q. and T.). Ripe red fruits eaten raw, but better when cooked ([26], p. 58). Green fruit roasted and eaten ; kernel of ripe fruit eaten.[14]

Eugenia eucalyptioides, used for jam ([2], p. 396).
E. grandis ; used for jam ([2], p. 396).
E. hemilampra, used for jam and jelly (*loc. cit.*).

E. myrtifolia, Brush Cherry, Native Myrtle ; fruit acid, makes good preserves ; juice contains free tartaric acid, cream of tartar, sugar, and red colouring matter ; fermented, yield wine possessing bouquet ([30], p. 608, N.S.W., Q.).

E. suborbicularis, Narrani ; important native fruit (28).

E. Tierneyana, fruit used for jam by settlers ([16], p. 29 ; [2], p. 397, Q.).

E. Wilsonii ; used for jam ([2], p. 397).

Ficus glomerata ; fruit eaten raw or stewed ; in times of scarcity, unripe fruit pounded, mixed with flour and made into cakes ([16], p. 31, Q., N.T.).

Gracilliaris conferioides, used for jelly in T. and S. Coast ([16], p. 33).

Lagenaria vulgaris, Aborigines known to eat it after preparation. In Japan fruit dried, extremities cut off, seeds and pulp removed, fruit cut in lengths, and hung on sticks to dry ; kept in tightly closed vessels ; to cook, boil with water, soy, sugar, mirin (a sweet wine) etc. ; it is comparatively rich in glucose and dextrin ([16], p. 36, Q.).

Leptomeria acida, Native Currants ; berries have pleasant sub-acid flavour ; used for jellies and preserves ([16], p. 38, T., N.S.W., Q.,[2]).

L. aphylla, used in S.A., V., N.S.W. ([16], p. 38).

L. Billiarderi, in T., N.S.W., V. (*loc. cit.*).

Macrozamia spp., nut kernels, eaten after pounding, macerating and baking ([16], p. 40. All exc. T. and V.).

Marsdenia Leichhardtiana, Doubah, Carcular ; milky unripe fruits edible ; better roasted ([16], p. 42).

Muhlenbeckia adpressa, Native Ivy, Macquarie Harbour Vine or Grape (T.) ; currant-like fruits, sub-acid, used for tarts, puddings and preserves ([16], p. 46. All exc. Q.).

Nephelium Lautererianam, makes delicious preserve ([2], p. 397).

Owenia venosa, Sour Plum, Tulip Wood ; beverage produced by boiling fruit, called wine after certain processes, has agreeable taste ([16], p. 49).

Pithecolobum moniliferum, pods roasted when young ; Mitchell River ([23], p. 15).

Podocarpus pedunculata, fruits roasted, crushed between two stones, water added, and then eaten ([23], p. 15).

P. spinulosa, Native Plum or Damson ; makes very good pudding with jam of native Currant (*Leptomeria acida*) ([16], p. 53, N.S.W.).

Pothos Loureiri, fruit roasted and eaten at Atherton (raw on the Tully) ([23], p. 15).

Randia Fitzalani, baked in ashes when green (N.Q.) ; also eaten raw when ripe ([23], p. 18).

Rhodomyrtus macrocarpa, baked in ashes and eaten raw ([23], p. 15, N.Q.).

Semecarpus australiensis, the roasted fruit tastes like roasted apples, dry like dates, fresh fruit, dry and astringent ([16], p. 57, Q., N.A.). The ripe fruits are skewered, roasted on ashes, and eaten ; if eaten raw said to produce sore lips or pain and swelling on broken skin ([23], p. 15, N.Q.). An Asia species *A. anacardium*, marking Nut Tree (India), Malacca Beans, Marsh Nuts (seeds) ; Portuguese at Goa salt green fruit and use like olives.

Sideroxylon chartaceum, eaten after roasting at Atherton, also raw (*loc. cit.*).

Sterculia caudata, fruits roasted and eaten ([23], p. 18).

Vitis acetosa and *V. nitens*, used for jams and jellies ([2], p. 398). See pp. 34–35 for *V. hypoglauca*.

II(a). Further Notes on Fruits.

The porous receptacle of the Blue Water Lily (*Nymphæa gigantea*) is peeled and then eaten raw, or is sometimes first roasted. The round ripened fruit containing seeds is also eaten raw or roasted—the light-coloured seeds being rejected and the brown or black retained. The tubers are also eaten ([21], p. 101). The seed capsules with seeds, form an important part of the diet of the Aborigines of Arnhem Land, especially during the dry season.[28]

The Aborigines of the Gulf of Carpentaria use the fruits of *Cycas* as a principal article of food during September. They are first thinly sliced, then dried, soaked in water, and packed in sheets of tea-tree bark. Fermentation ensues, destroying the harmful properties. Finally the mass is probably baked in or as cakes ([32], pp. 72–73). Thomson[28] states that this tree, *Cycas media*, yields large quantities of fruits, which require soaking for 3–5 days to leach out the soluble poison (see above, p. 130). They can be preserved some days or weeks after preparation. On account of this abundance, women can produce an adequate food supply for festivals and gatherings. It is also the principal food on ritual occasions, when only special persons partake of it.

The fruits of *Solanum esuriale* (see above, p. 128) are eaten raw ([21], p. 104), or raw and roasted (Cloncurry, etc.; [23], p. 18). Those of *S. petrophilum* are also eaten raw, and those of *S. ellipticum* raw in the Musgrave Ranges ([12], pp. 211, 338) and elsewhere ([23], p. 38). In the case of *S. hystrix*, the calyx and seeds are removed, and the pulp made into a cake with the pounded and baked bark of Mallee (*Eucalyptus*) roots; or they may be eaten raw after being first fermented by burying in the ground for a few days. The fruits of *S. semele* are similarly treated in Central Australia. Those of Colonial Kangaroo Apple, another *Solanum sp.* are eaten by Tasmanians ([6], p. 16).

The fruits of Breadfruit or Winnam (*Pandanus sp.*, see above, p. 126) are cut into 5 pieces and cooked by the Murngin tribe of N.A. ([29], p. 144). The Brisbane tribe chewed the ends of the fruits and sucked out the contents ([22], p. 94). Unless the fruits are very ripe, they are first roasted in ashes before being eaten ([23], p. 14). According to Dr. Leichhardt ([31], p. 73) the seed vessels are said to be soaked and then used to make a fermented liquor.

At Bloomfield River, N.Q., the fruits of the Large Lawyer Cane, the palm *Calamus australis*, are squashed and mixed with water to make an acid drink. They are eaten at Cooktown, and the young shoots, raw or roasted, at Atherton ([23], p. 10).

Fruits whose Botanical Identity is Uncertain.

Queensland: Wild strawberries and raspberries, including Dubbul; eaten by Brisbane tribes ([22], p. 94). Native Lime ([20], p. 92).

Central Australia: Native Cucumber; gooseberry-like fruits eaten ([11], p. 53), Yau-wulyuru, berries, including seeds, eaten by Wailbri tribe ([27], p. 290). Desert Banana, Yubuli; Desert Plum; Desert Raisin; Desert Tomato; see p. 130 for these four.

SEEDS

Acacia aneura, Wandalja, gathered in a pitchi, hot embers placed on top and seed half cooked, winnowed, ground dry, and mixed with water to make a damper. Musgrave Ranges ([12], p. 210); ground and eaten ([13], pp. 157, 164). Also called Mulga (white wood) or Witchetty seeds. Wailbri tribe, C.A. ([10], p. 175; [11], p. 57; [27], p. 291).

A. brachystachya, edible seeds ([13], p. 157).

A. cibaria, seeds used by natives for food ([16], p. 3).

A. Farnesiana, seeds used by natives for food ([26], p. 57; [21], p. 94).

A. frumentacea, stirling stated large seeds ground for food ([13], p. 154).

A. Kempeana, seeds used as food ([26], p. 57; [21], p. 94).

A. ligulata, Kakura, Wodika Bush; edible seed ([13], p. 157).

A. longifolia, Boobyalla (T.); seeds picked out and eaten ([16], p. 4).

A. Murrayana, Ngarra-ulla; seeds roasted and eaten ([13], p. 154).

A. pyrifolia, edible seeds ([26], p. 57; [21], p. 94).

A. salicina, seed ground and made into small loaves ([13], p. 157).

A. sentis, seeds used as food ([26], p. 57; [21], p. 94).

A. sophora, seeds roasted in pods ([6], p. 16, T.).

A. victoriæ, seed pounded and made into loaves ([13], p. 157).

Adansonia Gregorii, Sour Gourd, Cream of Tartar Tree; seeds eaten raw, or baked and ground;[21] Boabab Nuts, Tsimili; white kernels pounded, mixed with water, and eaten with fingers. Kimberleys ([15], p. 51).

Adanthera abrosperma (leguminosæ), Oon-doo; shining red and black, very hard seeds, roasted on coals and kernels eaten; grows in sandy poor country from Gilbert to the coast ([14], S.A.; [21], p. 94, N.Q.).

Amaranthus Mitchellii, seed used for damper ([13], pp. 153–157).

Araucaria Bidwillii, Bunya Bunya or Bunya tree; seeds 2″–2½″ × ¾″, eaten raw when tender, sweet taste; roasted when mature; taste like roasted chestnuts; fattening; sometimes stored in waterholes for a month or two; flavour considered better after start of germination; pounded into a meal and supposed to induce cannibalism (Q.); large quantities eaten at tribal fire. Aborigines sometimes travel far to reach these trees, which are divided between tribes and families, and handed down from generation to generation. Fruit is plentiful once in three years. In an area where trees were abundant, the government placed restrictions on felling, and trees reserved, this area approximately 80 × 40 miles. The tree could be more extensively cultivated, owing to food value of seeds; wood of secondary importance. It was brought to Kew by Bidwell and first described by Sir Wm. Hooker ([9], p. 197; [20], pp. 93–94; [21], pp. 90, 115).

Atripex vesicarum, Bladder Salt Bush ; seeds edible ([13], p. 165, C.A. ; [11], p. 57). Box tree ; seeds edible ([11], p. 57).

Brachychiton Gregorii (Sterculiaceæ), Kurrajong ; seeds eaten by Ngemba tribe of western N.S.W. ([10], p. 176 ; [26], pp. 56, 65) ; roasted and eaten.[12] *Brachychiton spp.* (from pp. 32–33).

Brachychitum populæum, Bottle Tree (V.), Black Kurrajong ; seeds edible and make good beverage ([16], p. 59, V., N.S.W., Q.)

B. australe, seeds eaten (*loc. cit.*).

B. paradoxum, seeds eaten roasted, N.Q. ([23], p. 18).

B. quadrifida, Kurrajong ; black seeds eaten raw, taste like filberts ; 10–11 per fruit ; western N.S.W., Q. ([16], p. 59 ; [23], p. 18).

B. rupestre, Kurrajong, Bottle Tree ; nuts eaten raw ([16], p. 10 ; [23], p. 18).

Calandrina balonnensis (Portulacaceæ), Manyura, Periculia ; seeds pounded to paste, eaten raw or baked ([4], pp. 149–154) ; seeds eaten with bread by whites, also by Aborigines who eat them mixed with baked bark ; seeds used for bread in S.A., N.S.W., Q. ([13], p. 161).

Canavalia obtusifolia, Yugam ; unripe seeds soaked in water, pounded, made into cakes and roasted ; if not prepared thus they are poisonous. Brisbane tribe ([22], p. 93 ; [16], p. 12, N.S.W., Q., N.A., W.A.).

Careya arborea, edible seeds, can be roasted ([16], p. 13, Q., N.A.).

Castanospermum australe, (Leguminosæ) Mai ; seeds edible (Australian Chestnut).[21] Nuts cracked, soaked, pounded, made into cakes and roasted ; otherwise poisonous ([22], p. 93 ; [23], p. 10).

Citriobatus pauciflorus, large seeds edible ([16], p. 16, N.S.W., Q., N.A.).

Cryptocarya Bancrofti and *C. Palmerstoni*, nuts roasted, shells cracked and kernels pounded into flour and soaked in water ; N.Q. ([23], p. 11).

Djunda, greyish seeds eaten ; Kimberleys ([15], p. 144).

Eleusine ægyptiaca, edible seed ([13], p. 159).

Endiandra insignis, nut roasted, cracked, kernel pounded with flour and soaked for several hours before eating ([23], p. 12, N.Q.).

Entada scandens, Matchbox or Queensland Bean ; beans first roasted or heated in stone oven, pounded finely, and put in bag in water for 10–12 hours before being eaten ; N.Q. ([21], p. 98). Only eaten in emergency ([23], p. 12). Also eaten in India after roasting ([30],III, 246).

Eragrostis Clelandii, seeds ground and made into damper.[14]

Erochloa punctata, seeds ground and made into damper ([13], p. 152).

Eucalyptus spp., seeds pounded to flour, baked and eaten. Musgrave Ranges ([12], p. 338).

E. bicolor, staple diet in Boulia District when grass seeds are scarce ; seeds soaked in water, ground and eaten raw ([23], p. 12).

E. microtheca, Karabash; seeds liberated from capsule in 5 days, winnowed, soaked in water all night, rubbed with hands to cool and dry; ground between large and small millstones; paste may be eaten dry or cooked in hot ashes ([13], pp. 152, 155, 157, 164, 165).

Eucarya acuminata, Native Peach or Quandong; seeds of a vine known as Cotton Food (Cuk-er-ger) picked when green and eaten with contents, cotton-like parts discarded. Ngemba tribe western N.S.W.; fruits and kernels eaten, Musgrave Ranges ([12], pp. 336, 340; [10], p. 175).

Grevillea annulifera, seeds have almond taste; W.A. ([16], p. 33).

Grewia polygama, Plain Currant; seeds, slightly acidulous, make good drink if boiled for an hour in water (Leichhardt; [16], p. 34).

Heterodendron oleifolium, Mindra; seeds eaten ([13], p. 159).

Ipomœa heterophylla, seeds crushed and eaten when fresh (not when ripe and dry; [13], pp. 155, 170).

Lepidium papillosum, Nalaka; seeds eaten ([13], p. 159).

Lily (probably Water Lily, see *Nymphæa*); seeds ground, made into dampers and eaten ([24], p. 469. [15]).

Linum marginale, Native Flax; mucilaginous seeds eaten by Aborigines ([16], p. 39, throughout).

Macrozamia Macdonnelli, kernels said to be eaten after removing poisonous properties ([26], pp. 59–60).

M. Miquelii, Dwarf Zamia; orange-red seeds first baked in ashes, then kernels soaked for some days in water, next pounded and roasted ([21], p. 98, N.Q.).

Macrozamia Miquelii (*Encephalartos Miquelii* ?), Dwarf Zamia or Banga; seeds baked for half an hour under ashes, kernels cracked, soaked in running water 6–8 days and then eaten. Cooktown, ([23], p. 15; [16], p. 41).

M. spiralis, Burrawang Nut; nuts edible; arrowroot obtained from them; Q., N.S.W. ([16], p. 41).

M. spp., kernels of nuts pounded and eaten, being macerated or baked by Aborigines ([16], p. 40).

Malaisia tortuosa, seeds roasted and eaten. Cooktown ([23], p. 15).

Marsdenia Leichhardtiana, seeds edible but better roasted (Mitchell; [16], p. 42; [13], p. 160. All exc. T.).

Mesembryanthemum æquilaterale, seeds edible ([13], p. 162).

Mucuna gigantea, seeds eaten after due preparation ([16], p. 45, northern N.S.W., Q., N.A.).

Nelumbium speciosum, Pink Water Lily; seeds cracked and eaten raw ([21], p. 101).

Nymphæa gigantea, fruits baked in hot stones and covered with bark, ashes, and sand; seeds removed when fruits soft, ground, rinsed several times and eaten ([23], p. 14, N.Q.).

N. spp., seed capsules an important food supply during dry season.[21]

Oryza sativa, Cloncurry ; seeds threshed, broken, winnowed, ground with water and roasted.[21]

Pandanus spp., see above, p. 126.

P. odoratissimus, seeds baked and soaked to obtain a sweet substance between the fibres ; also roasted and broken to obtain kernels ([16], p. 50).

Panicum cœnicolum, Jalghee allee ; seeds eaten ([13], p. 160).

P. decompositum, seed winnowed, ground, mixed with water to a paste, poured into hot ashes, and eaten as bread.[21]

P. gracile, Talghee ; seeds ground into flour and made into damper ; excellent food ([13], p. 160).

Paspaladium jubiflorum, seeds ground and made into damper ([13], p. 152).

Phaseolus Mungo, seed probably eaten ([16], p. 51, Q., N.T.).

Pittosporum phillyræoides, bitter seeds pounded in flour ([16], p. 53) ; seeds eaten ([13], p. 159). All exc. T.

Polygonum plebejum, seeds crushed on stones, cooked, and eaten as dampers ([13], p. 153).

Portulaca oleracea, Munyeroo, Pigweed, Purslane ; seeds eaten, Musgrave Ranges ([12], pp. 209, 336) ; also eaten roasted in C.A. ([3], p. 106) and N.A. ([21]. p. 36) ; seeds ground in mill for flour ; a coarse paste is made, which is acidulous, nutritive, antiscorbutic ([13], p. 152 ; [16], p. 53).

Pygeum Turnerianum, nuts eaten (Bloomfield River), but only when quite fresh ; whole fruit pounded, sifted through chilly bag ; resulting meal is "damped", kneaded into cakes, wrapped in wild ginger leaves and baked on ashes ([23], p. 15).

Rumex crystallinus, seeds converted into damper after grinding ([13], p. 153).

Securinega obovata, seeds edible (Malacca Beans, Moush Nuts) ; ([16], p. 57).

Sesbania aculeata, Nardoo ; N.Q. natives make bread of seeds (*loc. cit.*).

Solanum esuriale (Cf. p. 21), Yak-ka-berry ; seeds ground up with water into paste, baked in ashes.[21]

Sporobolus actinocladus, edible seed ([13], p. 159).

S. indicus, seeds rubbed out of soaked stalks, ground, baked for bread.[21]

S. Lindleyii, edible seeds ([13], p. 159).

Terminalia Catappa, Country Almond ; seeds edible ; look, but do not taste, like almonds ([16], p. 62, Q.).

Willa, a creeper ; seeds (also flowers and leaves) eaten ; C.A. ([11], p. 53).

Grass Seeds

Dactyloctenium radulans (Otetta). Macdonald Downs, C.A. ([23], pp. 36–37) used as food.

D. ægyptiaca (Cf. p. 30) ; seeds threshed in hole in ground by stamping with feet, winnowed, ground, rinsed with water, made into a paste, and eaten raw, or cooked in ashes like a damper(?). Boulia District, N.Q. ([23], p. 12).

Eragrostis eriopoda, Wire or Tussock Grass ; microscopic seeds collected, ground, and used as food. Musgrave and Everard(?) Ranges ([12], p. 339).

Panicum (?) *decompositum* (see above, p. 136) ; most largely used and collected in quantities ; prepared in same way as Munyeru (*Portulaca oleracea*) ; made into cakes in C.A. ([26], p. 61 ; see also [10], p. 175 ; [4], p. 15). Panic Grass ; seeds of *P. distachyum*, Ngilyara ; used as food in Macdonald Downs, C.A. ([8], pp. 36–37).

Sporobolis, tree *spp.*, given above, p. 136. *S. actinocladus* and *S. indicus* are prepared as there given for *S. indicus*. The fine seeds of *S. Lindleyii* are ground with water into a paste and baked in ashes ; N.Q. ([21], p. 104).

Other Gramineæ

The seeds of the following grasses are winnowed, made into dampers, and baked by the Wailbri tribe, C.A. ; Yugaraja, Wonuna, Yulumbura, Wogadi, Gan-dinba ([27], pp. 291–292 ; Cf. [3], p. 105 and [21], p. 102). In north-western N.S.W. the seeds of Nardu (not to be confused with Nardoo of C.A.) are eaten ([25], p. 89).

Whole Plant

Ammannia multiflora (Lythraceæ) ; whole plant pounded with feet to separate woody parts, then winnowed and ground with water on flat stones, and baked as a cake ; N.Q. ([21], p. 94).

Calandrinia volubilis, plant placed in a hole scraped in hot ashes, and then covered till cooked. Eaten in Musgrave Ranges ([12], p. 209).

(?) *Portulaca oleacea* (and probably other species), Parakylia ; plant eaten raw or baked in ashes ; C.A. ([26], p. 57).

Willa, see above, p. 136.

Water from Plants

This is, of course, an important matter in the more arid areas. The roots of the following plants all provide water : *Brachychiton Gregori* and other *B. spp.*, abundant quantity ([18], p. 650 ; [12], pp. 330, 331, 337). *Casuarina decaisneana* (also cavities in stems),[18] and *C. lepidophloia*.[14] *Eucalyptus dumosa*, roots cut up into 9″ lengths, water drains out into receptacle ([16], p. 25). *E. incrassata*, roots size of man's wrist best, 2″–9″ below surface, and 40–80 feet long ; one can satisfy 2 or 3 men ; can be plugged with clay for transport.[18] *E. microtheca*, Karabadi, Water Box, Tangoon ; same size and distance below best ; one quart of water in half an hour ([18] ?). *E. oleosa*, water for all purposes drained from roots, cut and placed on end ([21], [13]). *E. paniculatus*, see *E. incrassata*, ([18], pp. 648–649), *E. populifolia* (*loc. cit.*). *E. pyriformis*,[14] and *E. terminalis*, Bloodwood ; one bucket of water from tree (roots or stems ?).[18] *Hakea leucoptera*, Needle Bush, Pin Bush, Keoloora, Urrbi (S.A.) ; good drinking water, wineglassful, from fleshy roots ½″ diam., 6″–8″ long ([16], p. 34 ; [13], pp. 151, 152, 160, 165, 169 ; [18], [14]). *H. multilineata*.[14] The great nodular swellings of *Melaleuca* trees are tapped to provide a little water, though bitter and slightly mineralised ;[28] and by incising the vines of *Vitis hypoglauca*, Native or Gippsland Grape, water can be

obtained ([16], p. 66, Q., N.S.W., V.). As far as camels are concerned, a variety of the Ice Plant, Parakylia (see *Portulaca*, above), is moist enough to be as good as water to them.

Edible Parts Unspecified

Brasenia peltata, plant considered nutritious in America, probably from its large-grained starch ([16], Q., N.S.W., V.).

Calandrinia polyandra, Cecanda; used as food by some W.A. tribes (Mueller and Forrest; [16], p. 17). It is widely distributed in C., W. and N.A.

Cassytha filiformis, Dodder Laurel, Devil's Guts; plant used by Brahmins of southern India for seasoning their buttermilk ([16], p. 14, Q., N.T.).

Eucarya acuminata, Wuti, Wulti ([13], p. 167).

Garcinia Mestoni, edible ([2], p. 397).

Hydnangium glabrellum, Wiilichua? eaten raw ([13], p. 170).

Lepidium Muelleri-Ferdinandi, cooked and eaten ([13], p. 154).

Livistona australis, Cabbage Tree, Kondo; edible ([21], N.S.W.). Aborigines eat heart of tree raw or cooked; small quantities not indigestible ([16], p. 40, V., Q.).

Marsdenia viridiflora (Asclepiad); edible.[21]

Mimusops parvifolia, tree yield thick milky sap like fresh cream ([16], p. 45, Q., N.T.).

Schizomeria evata, edible ([2], p. 398).

Stenopetalum lineare, edible ([13], p. 159).

Typhonium Brownii, Arum; edible.[21]

Vitis hypoglauca, Native Grape, Gippsland Grape; could be improved by culture ([16], p. 66, V., N.S.W., Q.). (See also above, p. 132.)

Xanthorrhœa hastilis, edible.[21]

Zygophyllum fructicolosum, Medeewurta; eaten ([13], p. 159).

Z. glaucescens, eaten ([13], p. 159).

Ferns

The tops of the fern *Alsophila* are split open by Tasmanians who remove the pith, which is then roasted and eaten ([6], p. 16). In N.Q. the young growing point of *Alsophila Woollsiana* is roasted and eaten ([23], p. 9). The root of another fern, *Blechnum serrualtum*, is first roasted, scraped and cut up on a log with sharp stones, now ready to eat and called Bangwal (Brisbane tribe [22], p. 92; [23], p. 10). Roth[23] describes how the small rhizomes of *B. orientale* are first roasted, then hammered, before being eaten (N.Q.). A water fern known as Nardoo (*Marsilea quadrifolia*), contrary to general belief, was only used in times of drought, when seed was unobtainable. It was used in C.A., where no attempt was made to winnow the Seed other than removing the large husks. The whole was then ground up, mixed into a paste with water, and cooked in ashes ([10], p. 175). Another species similarly used as food in C.A. was *M. Drummondii* ([3], p. 104; [23], p. 14). Other authorities mentioning this use of water ferns (*Marsilea*) as food are ([11], p. 52; [4], p. 159; [12], p. 335).

The roots of the Mangrove Fern (*Acrostichum aureum*) are roasted and eaten at Cape Grafton, N.Q. ([23], p. 9). The rhizomes of *Aspidium unitum* (var. *proprinquum*) are eaten in N.Q., after being alternately roasted and pounded for a considerable time (*loc. cit.*).

Young shoots from the common fern (*Pteris esculenta* or *Pteris aquilinum* var. *esculentum*) are eaten in T., and its juice is also used ([6], p. 16). According to Mathew ([20], p. 92 ; [19], p. 89) the roots of the fern (probably *Pteris* sp.) are eaten by the Kabi and Wakka tribes.

In former times the tree ferns *Cyathea Cunninghamii* and *C. medularis* were both used as food in Australia, and the latter in New Zealand also.

Fungi

There are probably many species of edible fungi in Australia eaten by Aborigines. The following are only a few examples :

A kind of truffle is dug up on the western side of Ululigan, and the flesh after roasting has a yellowish colour, and appears to be a delicacy ([23], p. 13). Another underground kind (*Mylitta australis*) is first peeled, and then the inside is roasted and eaten in T. ([6], p. 15). There also a fungus called Punk, growing on *Eucalyptus* trees, is eaten roasted ([6], p. 16). *Scleroderma sp.*, a kind of puff ball known as Widida by the Aluridja and Wongapitcha, and Oridja by the Aranda, is usually cooked in ashes before being eaten, though it is sometimes eaten raw ([4], pp. 151–152 ; [12], p. 339). *Agaricus* (*Psalliotis*) *campestris*, the common mushroom, is found and eaten, but the dry climate makes it less abundant ([16], p. 3). Many species of *Boletus* are also used as food in Australia (Modern Cyclop.). *Hirneola auricula-judæ* ; largely used in China as food ; common European sp. ; on elder and elm ([16], p. 36, V., T., N.S.W.). *H. polytricha*, used to thicken soup ; found in New Zealand, exported to China ; common in Port Jackson and along the east coast (*loc. cit.*) S.A., N.S.W., Q. *Cyttaria Gunnii* is an edible fungus on the branches of *Nothofagus Cunninghamii* in T. ([16], p. 21).

Seaweeds

Eucheuma speciosa, the Jelly Plant ; is a very glutinous seaweed used for jelly, blanc-mange, and also for size and cement ([16], p. 28, W.A.).

In T. the large thallus of a large species of seaweed is fished up from the sea, macerated in fresh water, and " roasted to a leathern consistence and flavour " ([6], p. 16). Bull Kelp (*Durvillea antarctica*) is treated in this way in New Zealand, but used for medicine rather than for food. It is probably the " large species " here mentioned.

Gall Nuts

The gall nuts and excrescences, known as Mulga Apples, formed on the twigs of Mulga (*Acacia aneura* and probably other *spp.*) and Bloodwood (*Eucalyptus corymbosa*) are eaten ([4], p. 152 ; [37], pp. 292–294 ; also those found on the twigs of *E. tetradonta* ([21], p. 99).

Orchids

The tubers of different kinds of ground orchids are dug up and eaten by the Brisbane tribe ([22], p. 93). The Aborigines of Wide Bay and the North Coast dig up and eat the tubers of *Cymbidium canalicatum* ([21], p. 97).

The pseudobulbs of *Dendrobium canalicatum*, after the old leaves have been removed, are baked and eaten in N.Q. ([23], p. 11).

Famine Foods

Gum, Manna, Sap, Nectar. Aborigines use as food the gums of certain *spp.* of *Acacia, A. Cambagei* (Gidgee or Bitter Gum ; [13]) ; *A. decora* ;[21] *A. homalophylla*, Gidya Tree ; *A. leiophylla*, a favourite in the Musgrave Ranges ([12], p. 329 ; [17], p. 5) ; and an *A. sp.*[14] For *Livistona australis*, see above, p. 138. A *sp.* of *Terminalia* yields a gum which the natives roast, and which can be added to gelatine soup (Leichhardt). The manna-like and sweet-tasting gun from the *Myoporum platycarpum* (Myoporaceæ), though eaten (Musgrave Ranges) is not much liked, probably because of its laxative properties ([12], pp. 333–335 ; [17], pp. 1–5). The manna in this and other cases is probably produced by insects. The gum (Denna) of the Dogwood, *Jacksonia scoparia*, was much eaten by the Brisbane tribe.

The nectars of *Banksi spp., B. dentala* and *B. marginata* ; of *Bauhinia Carronii* ; of an *Eremophila sp.* ; of *Grevillea Kennedyana* ; of *Lambertia formosa, Leptospermum coriaceum*, and *Telopia speciosissima*, given on p. 13, are classed among the famine foods.

Eucalyptus dumosa A. Gunn., the White Mallee of S.A. ; yields manna called lerp or larp, the nidus of an insect (*Psylla Eucalypti*) ; like small shells, white and sweet ; water 14%, thread-like portion 33%, sugar 53% ; threads similar to starch, and when the sugar is dissolved in water they swell slightly (and slightly dissolve also) ; thus freed from sugar they consist of *Lerp-amylum* $C_6H_{10}O_5$—44·4 C and 6·24 H. This on digestion with dilute sulphuric acid etc. forms a crystallizable carbo-hydrate which agrees in its properties with dextrin ([16], p. 25). *E. Gunnii* Hook f., Cider Gum (T.), White, Sugar or Swamp Gum ; sweet sap converted by settlers into cider ([16], p. 27) T., V., N.S.W. *E. Raveretiana* F.v.M., Grey or Iron Gum, Thozet's Box ; from cuts in stem, an acidulous almost colourless liquid exudes in considerable quantity. Resembles *E. Gunnii* (*loc. cit.* Q.). *E. terminalis* F.v.M., Bloodwood Tree ; manna from leaves falls off or is obtained by pounding and roasting.[21] *E. viminalis* Labill., Manna, White, Swamp, Grey or Drooping Gum etc. ; a white, sweet, crumbly, and very pleasant manna exudes from bark in pieces the size of peas, looks like lime ; consists of an unfermentable sugar called *Eucalin* with a fermentable one supposed to be *Dextro-glucose* ([16], p. 27, S.A., T., V., N.S.W.).

Stems, Stalks, and Shoots. Cymbidium canaliculatum ; stems eaten (p. 7). *Geitonoplesium cymosum* A. Cunn. ; young shoots a substitute for asparagus ([16], p. 32, V., N.S.W., Q.). *Hibiscus heterophyllus*, Queensland Sorrel ; shoots eaten raw ([16], p. 35, and above, p. 113) ; all exc. W.A. *Macrozamia spp.* ; starch washed out of stems, and heat destroys poison principle ([16], p. 40) ; all exc. T., V. *Marsdenia*

australis ; stems eaten.[14]. *Polygonum gladbrum* Will. ; pulled off stems broken up, lightly cooked, and pith eaten ([13], p. 153). *Portulaca oleracea* and *Polygonum hydropiper* ; stalks eaten. *Salicornia australis* ; young shoots pickled ([16], p. 56). *Sonchus oleraceus*, Sow Thistle ; stems eaten (Hooker) ; young shoots make excellent vegetable (Leichhardt ; [16], p. 59). *Brachychiton rupestre*, Kurrajong or Bottle Tree ; large quantity of mucilaginous substance, resembling pure tragacanth, in stems, wholesome and nutritious ; clear jelly obtained from pouring boiling water on chips of wood ; soft juicy tissue of stem edible ; water also procurable by cutting holes in soft trunk ; fruit too has sweet juice ([16], p. 60, Q.). *Typha Muelleri* ; young shoots edible like asparagus ([16], p. 159).

Flowers and Buds. Given above, p. 121 are the flowers and buds of the Native Pear (*Marsdenia australis*) and the flowers of *M. Leichhardtiana*. The young buds of the following are also eaten, raw : *Hibiscus divaricatus* and *H. penthaphyllus* ;[14] *Ipomœa turpethum* ; young buds eaten raw when seeds are white ; baked for peas by white people ; plentiful after wet season.

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NOTES ON THE VEGETABLE FOODS OF THE WALBIRI OF CENTRAL AUSTRALIA

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IN his summary "Wild and Emergency Foods of Australian and Tasmanian Aborigines" (*Oceania*, Vol. XXVIII, p. 113), Irvine cites a brief but very useful paper by Sweeney (*Oceania*, Vol. XVII, pp. 289–97, 1947) discussing Walbiri diet in western central Australia. In 1953–1955, during anthropological field-work among Walbiri, I was able to extend Sweeney's observations. I was assisted in this by George Chippendale, botanist of the Animal Industries Department at Alice Springs, who very kindly advised me on the identification of many of the floral specimens I collected. Such positive identification is, of course, a most valuable aid to the field-worker interested in Aboriginal diet, especially as vegetable foods normally form something like 70%–80% of Walbiri diet (in the absence of Administration or cattle station food issues). Flesh foods, although highly prized, are not easily obtained for much of each year in the central desert; and of these, reptiles (especially goannas and lizards) are the most common.

Seeds comprise by far the major part of Walbiri vegetable foods. Almost all are collected by women, ground on stones to form a coarse meal which is worked into an unleavened, unsalted paste with the addition of water. In most cases, this is cooked in the ashes to make a heavy, tasteless, evil-looking but nourishing cake. Presumably Walbiri derive sufficient salt for their needs from the uncooked xerophilous plants they eat, for I have never seen them use any native-produced mineral salt, and rarely do they accept the salt offered them on stations and settlements. Seeds are gathered from the following trees and shrubs[2]: *mandja* (mulga), *Acacia aneura*; *mandala*, *A. notabilis*; *banguna*, *A. coriacea*; *jadanbi* (ironwood), *A. estrophiolata*; *ŋalgari* (witchetty bush), *A. kempeana*; *gurada*, *A. sp.* (*tetragonophylla ?*); *minjana* and *ganalarambi*, both *A. spp.*; *wadiawanu*, *Hakea sp. ?*; *jildilba* (beefwood), *Grevillea striata*; *miaga*, *Brachychiton sp. ?*; from the following plants: *ŋalaŋgadabi*, *Ipomea muelleri*; *ŋalgurandji*, *Ipomea sp. ?*; *wagadi* (pigweed), *Portulaca sp.* (*oleracea ?*); and from the following grasses (the seeds of which are often gathered in quantity from ants' nests): *jibiri* (mulga grass), *Aristida sp. ?*; and *jugaridja*, *julumburu*, *lugarara* and *bunadodo* (none of which is identified).

Most edible fruits (in the broad sense of the term) available to Walbiri are eaten raw and, often, unripe; but a few such as *miali*, *djuguru* and *ŋaijagi* may be roasted in the ashes in an attempt to enhance their keeping properties. Fruits, like most

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[2] In the Walbiri terms, *j* has the value of English initial *y*. I may add that each plant has two or three synonymic names.

vegetable foods, are gathered by women, and are obtained from the following trees and shrubs: *jauwaljuru* (wild plum), *Canthium latifolium*; *wadagi* (wild orange), *Capparis mitchelli*; *djuguru* (another wild orange), *Capparis sp.* ?; *managidji* (conkerberry), *Carissa lanceolata*; *widjirgi* (wild fig), *Ficus platypoda*; *mugagi* (wild plum or cherry), *Santalum lanceolatum*; *moiju* (another wild plum), *Santalum sp.* ?; *miali* (nutwood), unidentified; *wagulwalba*, unidentified; *gulgrbi* (desert oak), *Casuarina decausneana*; and from the following plants: *njanjagiri* (mistletoe), *Loranthus sp.*; *djagudaguda* (another mistletoe), *Loranthus sp.* ?; *jubali* (bush banana), *Marsdenia australis*; *garaba* (desert raisin), *Solanum ellipticum*; *wangi* (desert raisin), *Solanum sp.*; *wanagidji*, *ŋaijagi* and *djalbalba* (all desert tomatoes and very similar), *Solanum spp.* ?

Edible leaves form but a minute part of the diet and are usually eaten raw They include: *jubali*, *Marsdenia australis*; *mianba*, *Eremophila sp.* ?; *wagadi*, *Portulaca sp.*; and *ŋagabala*, an unidentified vine.

Flowers are occasionally sucked for their nectar, or are steeped in water to make a mildly sweet, unfermented beverage. Those used are: *biriwa*, *Hakea lorea* and *H. intermedia*; *ŋabiri* (river red gum), *Eucalyptus camaldulensis*; *wanjari*, *Bauhinia hookeri*; *ganalarambi* and *juwalaji*, both *Acacia spp.*; *mianba*, *Eremophila sp.* ?; *wilbinjari*, *Grevillea sp.* ?; *ŋalaŋgini* (mistletoe), *Loranthus sp.* ?;; *jubali*, *Marsdenia australis*.

Of the edible roots, yams are the most important. They survive even severe desert droughts, and provide a dependable and life-sustaining food supply in the worst seasons. Most roots, except spinifex internodes (a despised and tasteless stopgap), are roasted before eating. *jala* (*yam*), *Dioscorea sp.*; *wabidi* (yam), *Vigna lanceolata*; *djanmara* (wild onion), *Cyperus sp.*; *waijibi*, *Borehavia diffusa*; *bunaiːi*, similar to *Boerhavia*; *jenindi* (young bean tree), *Erythrina vespertilio*; *dabudibji* (wild carrot), *Didiscus sp.* ?; *mana* (spinifex internodes), *Triodia sp.*

Miscellaneous foodstuffs include gum from *Acacia notabilis* trees, the galls or "apples" (with their larvæ) on bloodwoods (*wirgali-Eucalyptus terminalis*), lerp or psyllid manna on *E. terminalis* leaves, and at least two fungi, *jagiraru* (*Podaxon sp.* ?) and *wiljari* (*Scleroderma sp.* ?).

Walbiri (especially men) collect and chew as narcotics both pituri (*djunbunbu*, *Duboisia sp.*) and tobacco (*djanjuŋu*, *Nicotiana sp.*). They often mix with the chewing wad in order to make it bite the palate, the ash of the burned leaves and/or bark of: *jadanbi*, *Acacia estrophiolata*; *jildilba*, *Grevillea striata*; *djirindi*, *Grevillea sp.* ?; *wabaliŋgi* (coolibah), *Eucalyptus microtheca*.

Steam from *Eucalyptus spp.* leaves, especially of broad-leafed box and mallee, placed over coals is inhaled to relieve common colds and influenza. Sprigs of an aromatic samphire, *djuŋara-djuŋara*, are inserted through the hole in the nasal septum to be smelled to cure headaches. This samphire is also eaten green in small amounts to act as a laxative. Immediately after childbirth, women squat naked in the smoke rising from *Acacia dictyophleba* leaves placed on coals in order to "strengthen" their vaginas.

There are a number of trees and plants in the Walbiri environment which do not normally provide food, although some would doubtless be used reluctantly in times of severe food shortage. Some of these, such as *Eucalyptus microtheca* and *Acacia farnesiana* (*budunari*) regularly provide food for other tribes, so it seems that mere availability does not guarantee that an edible plant will be used in a given area. Other Walbiri flora, such as *jilaŋgurunju* (mallee), *Eucalyptus gamophylla ; wabanuŋgu* (ghost gum), *E. papuanis ; ŋaljabi* (vine), *Hoya australis ; bagali* (paperbark), *Melaleuca sp. ; walagari* (supplejack), *Ventilago viminalis ; murulumbu, Prakinsonia aculeata ; ŋalulbu* (emu bush), *Eremophila longifolia ; waŋari* (pine), *Callitris glauca ; wanaguru* (whitewood), *Atalaya hemiglauca ; wari:i, Cassia artemesioides ; bidalba-dalba, C. pleurocarpa ; binambali* (desert rose), *Cienfugosa gossypoides ; wananbanaba* (hairytails), *Trichinium spp. ;* and *djilgali* (bullheads), *Tribulus sp.*, appear to have no edible properties, or, if they have, Walbiri are not aware of them.

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BLOOD GROUPS OF THE NATIVE INHABITANTS OF BOUGAINVILLE, NEW GUINEA

By J. Kariks, Olga Kooptzoff and R. J. Walsh

THE island of Bougainville was discovered in 1768 by the French sailor, Lieutenant Bougainville. It is approximately 160 miles long and between 35 and 40 miles wide, and lies about longtitude 155° East and latitude 6° South. Geographically it is part of the Solomon Islands, to the North East of New Guinea, but it is administered by the Australian Government as part of the Territory of Papua and New Guinea. The island is mountainous, heavily wooded, fertile and has a heavy rainfall. Figure 1 shows the administrative subdistricts of the island.

Table 1.

Heights and Weights of Some Bougainville Natives.

Source of Material.	Sex.	Number Measured.	Weight, Mean and Range. (Pounds.)	Height, Mean and Range. (Inches.)
Bonamung Village ; Kieta Subdistrict	Male.	48	132 (104–162)	64 (59–68)
	Female.	26	114 (84–138)	60 (55–64)
Torau Group in Rorovana Village : Kieta Subdistrict.	Male.	48	141 (102–172)	64 (61–69)
	Female.	77	115 (84–152)	60 (56–66)
Taurapela Village : Kieta Subdistrict	Male.	11	129 (108–160)	63 (59–67)
	Female.	12	108 (88–128)	59 (56–61)
Makeniko Village : Kieta Subdistrict	Male.	11	128 (114–156)	63 (60–66)
	Female.	15	103 (84–144)	58 (55–61)
Tavidua Village : Kieta Subdistrict	Male.	21	138 (112–156)	63 (59–67)
	Female.	25	107 (84–138)	59 (55–62)
Nagovissi natives : Buin Subdistrict	Male.	15	131 (118–152)	63 (60–66)
Sivai natives : Buin Subdistrict (working on Arawa plantation).	Male.	46	128 (98–154)	63 (59–69)

The natives are dark skinned, with some variation in colour. The hair is black and frizzy and is kept shorter than that of the New Guinea native. The facial hair is sparse and bristly, the nose generally broad and the lips thick but not everted. The heights and weights of several series of natives were measured, with the results shown in Table 1. The average stature is fairly uniform for the different groups, the males

[1] From the Department of Public Health, Bougainville, Territory of Papua and New Guinea, and the New South Wales Red Cross Blood Transfusion Service.

showing mean values of about 5′ 3″ and the females of about 4′ 11″. There is more variation in the weights of both sexes, and this is possibly related to the nutritional status of the subjects measured.

The food supply is mainly vegetable—bananas, taro, sweet potatoes, yams, bread fruit, sugar cane and various tropical fruits comprising the bulk of the diet. Natives living on the coast eat fish. Some inland river fishing is undertaken, but it does not contribute greatly to the diet. Domestic pigs are killed only on special occasions. In a few places bread is baked locally, and rice and tinned fish are occasionally consumed.

This paper describes an investigation of the blood groups of the islanders, conducted from the Kieta subdistrict. The population of Kieta subdistrict, including plantation labourers, is approximately 10,700. One of us (J.K.) obtained blood samples from several thousand inhabitants. No hospital patients were included in the series and most samples were collected during patrols into the villages. All available subjects were included without selection, except that blood was not taken from children under two years of age.

Materials and Methods

Blood was taken from the cubital veins with aseptic precautions, and about 5 ml. from each subject was placed in a small bottle containing approximately 53 mgm. trisodium citrate, 0·625 mgm. calcium penicillin and 2·5 mgm. streptomycin hydrochloride. As soon as the blood was added, the bottle was shaken to dissolve the crystals, which prevented coagulation and bacterial growth. The samples were despatched to Sydney by air with the least possible delay and were not refrigerated during transit. They were usually tested from three to four days after collection, but on a few occasions delays occurred in transit and a longer interval elapsed.

An aliquot was removed from each sample for determination of the hæmoglobin value and suspensions of the red cells were prepared in physiological saline solution for blood group investigations. The red cells for these suspensions were washed three times with physiological saline before testing and the final suspensions diluted appropriately with saline immediately before use. The methods used for determining the blood groups were those described by Mollison, Mourant and Race (1952) and the gene frequencies were calculated by methods described by Walsh, Kooptzoff, Dunn and Atienza (1954).

The subjects of the survey were all resident in the Kieta administrative area and their blood was obtained in this region. Not all the subjects were, however, indigenous to the Kieta region, because many from other areas were employed on plantations or attending a Mission school within Kieta. It has been possible to divide the subjects into groups on the basis of administrative districts, languages spoken, and geographic regions of subjects indigenous to the Kieta region.

1. Administrative Districts

Three groups were analysed, those indigenous to Kieta, those born in Buin and those born in Sohana subdistrict.

FIGURE I
Map of Bougainville showing the administrative subdistricts.

2. Language Groups

These include 2331 Nasivoi-speaking subjects, 352 Torau-speaking people from Tarara, Vito and Rorovana, 48 Evo-speaking people from Kopani and Borvi and 58 Sivai-speaking people from the Buin subdistrict. Some of the subjects included in the totals of Tables 2, 3 and 4 were excluded from these analyses as they could not be placed in any of these language groups.

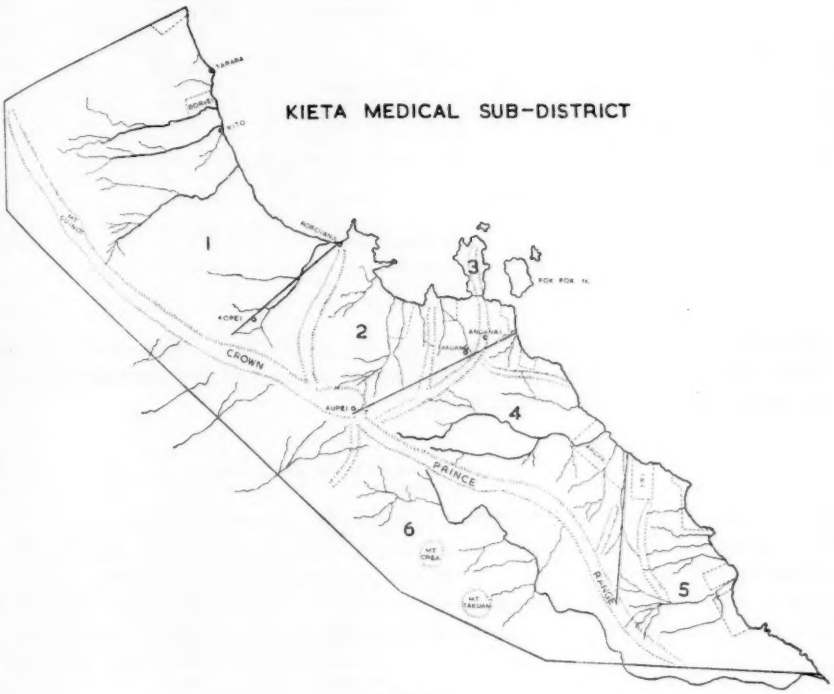

FIGURE II
Map of Kieta Subdistrict showing the arbitrary divisions used in the analyses.

3. Geographic Regions within Kieta

All subjects tested from the Kieta subdistrict were included, with the exception of those working on plantations or living in a mission school but born in other districts, and a group of 352 people living in Rorovana, Tarara and Vito who are mainly the descendants of Buin people migrating to Kieta towards the end of the 19th Century. They are known as the Torau-speaking people. The geographic areas have been determined in an arbitrary fashion, solely with the object of testing the homogeneity of the indigenous Kieta population. The subdivided areas are as follows: (1) north of the Crown Prince Range and west of Rorovana and Kopei;

(2) north of the Crown Prince Range, east of Rorovana and Kopei and west of and including Mauang and Kupei; (3) Pok-Pok and the adjacent peninsula; (4) north of Crown Prince Range, east of but not including Mauang and Kupei and west of a

TABLE 2.
The ABO Groups of the Bougainville Natives.

Group	Observed Numbers.	Observed Frequency.	Expected Numbers.
O	1325	0·4636	1330·9
A_1	1170	0·4094	1175·7
B	258	0·0903	259·2
A_1B	105	0·0367	92·2
Total ..	2858	1·0000	2858·0

Gene Frequencies
O =0·6824
A_1=0·2541
B =0·0635

line drawn north/south between Aropa and Iwi plantations; (5) southern end of Kieta east of a line drawn north/south between Aropa and Iwi plantations; and (6) south west of the Crown Prince Range.

TABLE 3
The MNS Groups of the Bougainville Natives.

Group.	Observed Numbers.	Observed Frequency.	Expected Numbers.
MMS	1	0·0003	0·8
MsMs	136	0·0476	128·1
MNS	121	0·0423	108·1
MsNs	819	0·2866	848·3
NNS	356	0·1246	368·9
NsNs	1425	0·4986	1404·4
Total ..	2858	1·0000	2858·6

Gene Frequencies
MS=0·0007
Ms =0·2117
NS=0·0867
Ns =0·7010

Some samples which were tested were not included in this analysis because there was insufficient knowledge for locating the place of residence.

The significance of differences between these groups was determined by calculating χ^2 for each of the blood group systems. Within the MNS system two analyses were

made. For the first only the three phenotypes M, MN and N and for the second only the reactions with anti S were considered. Within the Rh system the subjects were divided into three categories: those homozygous for CDe, those heterozygous for CDe and those not possessing the CDe chromosome.

TABLE 4

The Rh Groups of the Bougainville Natives.

Reactions with Antisera. D	C	E	c	Most Common Genotype.	Observed Numbers.	Observed Frequency.	Expected Numbers.
+	+	—	—	CDe /CDe	2264	0·7922	2264·3
+	+	+	+	CDe /cDE	506	0·1770	515·1
+	+	—	+	CDe /cDe	16	0·0056	15·8
+	—	+	+	cDE /cDE and cDE /cDe	40	0·0140	30·6
+	+	+	—	CDE/CDe	32	0·0112	32·2
	Total ..			.. ..	2858	1·0000	2858·0

Gene Frequencies

CDe (R_1) = 0·8901
cDE (R_2) = 0·1005
cDe (R_0) = 0·0031
CDE (R_z) = 0·0063

RESULTS

It is usual in investigations of this nature to test unrelated subjects. In Bougainville the whole available population was sampled, with the exception of children under two years of age as stated above. To test whether this widespread sampling might influence the results, the blood groups of the population as a whole were compared with the blood groups of the adult males (18 years and over). The χ^2 values obtained were as follows:

ABO system $\chi^2 = 0·12$ for 3 degrees of freedom;
P lies between 0·90 and 0·95.

MN system $\chi^2 = 0·62$ for 2 degrees of freedom;
P lies between 0·70 and 0·80.

S system $\chi^2 = 0·80$ for 1 degree of freedom:
P lies between 0·30 and 0·50.

Rh system $\chi^2 = 2·17$ for 2 degrees of freedom;
P lies between 0·30 and 0·50.

In view of these findings the remaining analyses in this paper involved the total populations and no attempt was made to separate the adult males.

ABO Blood Groups

An analysis is shown in Table 2. All samples that reacted with anti A were also tested with anti A_1, but no negative reactors were found. There is close agreement between the observed and the expected numbers and the gene frequencies do not differ greatly from those found in the white Australian population.

MNS Blood Groups

These are shown in Table 3. Although there are small differences between observed and expected numbers, these do not reach a level of significance. One subject who was group M reacted with anti S, but it was not possible to check this result because a duplicate sample of his blood could not be obtained. It will be seen that 16·7% of the subjects reacted with anti S and that, as in other Pacific populations, the S gene was almost always associated with the N gene. 11·0% of the N-containing chromosomes contained S.

Rh Blood Groups

The Rh groups are shown in Table 4. It will be seen that four antisera—anti D, anti C, anti E and anti c were used for the tests. It is not possible to distinguish the chromosome combination shown as cDE (R_0) from the chromosome cde (r) in heterozygotes. The sum of these two possible chromosomes is shown in the table as cDE because this combination is known to occur in the Pacific region, whereas cde has not been identified. The finding of CDE (R_z) is of interest, because this gene combination is postulated by Fisher to result from the crossing over the common chromosomes CDe and cDE. Its absence from other series tested in the Pacific region has been difficult to explain.

Distribution of Blood Groups in Bougainville Administrative Areas

The distribution in the three administrative subdistricts of Kieta, Buin and Sohana is shown with the gene frequencies in Table 5. χ^2 values were calculated for each of the blood group systems with the following results:

ABO system $\chi^2=35\cdot97$ for 6 degrees of freedom; p is less than 0·001.

MN system $\chi^2=77\cdot32$ for 4 degrees of freedom; p is less than 0·001.

S system $\chi^2=12\cdot36$ for 2 degrees of freedom; p lies between 0·01 and 0·001.

Rh system $\chi^2=7\cdot12$ for 4 degrees of freedom; p lies between 0·10 and 0·20.

Significant differences were thus found in the ABO, MN and S systems but not in the Rh system.

TABLE 5.

The Distribution of Blood Groups in Bougainville Administrative Subdistricts.

Group.	Kieta.		Buin.		Sohana.	
	Observed Numbers.	Frequency.	Observed Numbers.	Frequency.	Observed Numbers.	Frequency.
O	1144	0·4809	162	0·3732	19	0·4222
A_1	968	0·4069	187	0·4309	15	0·3333
B	188	0·0790	62	0·1429	8	0·1778
A_1B	79	0·0332	23	0·0530	3	0·0667
Total ..	2379	1·0000	434	1·0000	45	1·0000
MMS	1	0·0004	0	0·0000	0	0·0000
MsMs	83	0·0349	48	0·1106	5	0·1111
MNS	95	0·0399	26	0·0599	0	0·0000
MsNs	651	0·2736	153	0·3525	15	0·3333
NNS	321	0·1349	35	0·0806	0	0·0000
NsNs	1228	0·5162	172	0·3963	25	0·5556
Total ..	2379	0·9999	434	0·9999	45	1·0000
CDe /CDe ..	1900	0·7987	333	0·7673	31	0·6889
CDe /cDE ..	417	0·1753	79	0·1820	10	0·2222
CDe /cDe ..	3	0·0013	12	0·0276	1	0·0222
cDE /cDE } ..	31	0·0130	7	0·0161	2	0·0444
cDE /cDe }						
CDE/CDe ..	28	0·0118	3	0·0069	1	0·0222
Total ..	2379	1·0001	434	0·9999	45	0·9999

Gene Frequencies.

Gene Frequencies.	Kieta.	Buin.	Sohana.
O	0·6955	0·6084	0·6537
A_1	0·2495	0·2846	0·2208
B	0·0550	0·1070	0·1255
MS	0·0011	0·0000	0·0000
Ms	0·1910	0·3168	0·2778
NS	0·0908	0·0730	0·0000
Ns	0·7171	0·6101	0·7223
CDe	0·8937	0·8760	0·8300
cDE	0·0990	0·1044	0·1434
cDe	0·0007	0·0158	0·0134
CDE	0·0066	0·0039	0·0133

ABO System

These differences are mainly due to a higher frequency of group O and a lower frequency of group B in the Kieta than in the Buin subdistrict. It can be seen that 11·2% of all the subjects reacted with anti B in Kieta, 19·6% in Buin and 24·4% in Sohana.

MN System

In both Buin and Sohana 11·0% of the subjects were group M, whereas only 3·9% in Kieta belonged to this group.

S System

Positive reactors with anti S were 17·5% in Kieta, 14·0% in Buin and none in Sohana. This last is of interest although only 45 subjects were tested.

Distribution of the Blood Groups in the Language Groups in Bougainville

These are shown in Table 6. The significance of the differences was calculated by χ^2.

ABO system $\chi^2=36\cdot22$ for 9 degrees of freedom; p is less than 0·001.

MN system $\chi^2=119\cdot66$ for 6 degrees of freedom; p is less than 0·001.

S system $\chi^2=16\cdot94$ for 3 degrees of freedom; p lies between 0·01 and 0·001.

Rh system $\chi^2=17\cdot55$ for 6 degrees of freedom; p lies between 0·01 and 0·001.

The significance of these differences is to a large extent related to the geographic areas in which the different languages are spoken. The Nasivoi-speaking people are resident in the Kieta subdistrict and the distribution of the blood groups is very similar to that shown in Table 5 for the Kieta subdistrict. The Evo-speaking people live in a mountainous region in Kieta, and it may be of significance that no reactors with anti B were found amongst them. Both the Sivai and the Torau-speaking people come from the Buin subdistrict, and in both groups the percentage of group A subjects is greater than the percentage of group O. However, the frequencies of the M gene and the cDE chromosome are greater amongst the Torau speakers than amongst the Sivai speakers.

Distribution of the Blood Groups in Subdivisions of the Kieta Subdistrict

The basis of this subdivision has been described above. The numbers of subjects in each of the areas was as follows: Area 1—51, area 2—1,099, area 3—148, area 4—416, area 5—580, area 6—63. χ^2 was calculated for each of the blood group systems with the following results:

ABO system $\chi^2=25\cdot56$ for 15 degrees of freedom; p lies between 0·02 and 0·05.

MN system $\chi^2=19\cdot24$ for 10 degrees of freedom; p lies between 0·02 and 0·05.

S system $\chi^2=51\cdot88$ for 5 degrees of freedom; p is less than 0·001.

Rh system $\chi^2=20\cdot22$ for 10 degrees of freedom; p lies between 0·02 and 0·05.

TABLE 6

The Distribution of Blood Groups in Bougainville.
Language Groups.

Group.	Nasivoi.		Evo.		Sivai.		Torau.	
	Observed Numbers.	Frequency.	Observed Numbers.	Frequency.	Observed Numbers.	Frequency.	Observed Numbers.	Frequency.
O ..	1117	0·4792	27	0·5625	20	0·3448	130	0·3693
A_1 ..	947	0·4063	21	0·4375	25	0·4310	156	0·4432
B ..	188	0·0806	0	0·0000	10	0·1724	48	0·1364
A_1B ..	79	0·0339	0	0·0000	3	0·0517	18	0·0511
Total	2331	1·0000	48	1·0000	58	0·9999	352	1·0000
MMS ..	1	0·0004	0	0·0000	0	0·0000	0	0·0000
MsMs ..	80	0·0343	3	0·0625	0	0·0000	46	0·1307
MNS ..	94	0·0403	1	0·0209	3	0·0517	22	0·0625
MsNs ..	642	0·2754	9	0·1875	8	0·1379	139	0·3949
NNS ..	313	0·1343	8	0·1666	12	0·2069	20	0·0568
NsNs ..	1201	0·5152	27	0·5625	35	0·6034	125	0·3551
Total	2331	0·9999	48	1·0000	58	0·9999	352	1·0000
CDe /CDe	1858	0·7971	42	0·8750	54	0·9310	258	0·7329
CDe /cDE	412	0·1767	5	0·1041	4	0·0690	73	0·2074
CDe /cDe	3	0·0013	0	0·0000	0	0·0000	11	0·0313
cDE /cDE cDE /cDe	30	0·0129	1	0·0209	0	0·0000	7	0·0199
CDE/CDe	28	0·0120	0	0·0000	0	0·0000	3	0·0085
Total	2331	1·0000	48	1·0000	58	1·0000	352	1·0000

Gene Frequencies.

Gene Frequencies.	Nasivoi.	Evo.	Sivai.	Torau.
O ..	0·6943	0·7500	0·5798	0·6048
A_1 ..	0·2495	0·2500	0·2899	0·2923
B ..	0·0562	0·0000	0·1303	0·1029
MS ..	0·0011	0·0000	0·0000	0·0000
Ms ..	0·1915	0·1667	0·0948	0·3594
NS ..	0·0906	0·0986	0·1390	0·0615
Ns ..	0·7168	0·7347	0·7661	0·5791
CDe ..	0·8928	0·9354	0·9649	0·8561
cDE ..	0·0998	0·0646	0·0351	0·1207
cDe ..	0·0007	0·0000	0·0000	0·0183
CDE ..	0·0067	0·0000	0·0000	0·0050

There is thus no evidence of heterogeneity within the Kieta subdistrict as far as the ABO, MN and Rh systems are concerned. On the other hand, the percentage of positive reactors with anti S in the arbitrarily defined areas varies from 8·5% in area 2 to 24·3% in area 3. As the χ^2 value shows, this heterogeneity is unlikely to be

due to chance but there is no gradient geographically and therefore no suggestion that the observed variations are the result of mixture of the indigenous natives with an extraneous group.

Discussion

Some gene frequencies of native groups in the Pacific are shown in Table 7. The Bougainville group has lower frequencies of B, S and R_1 (CDe) and higher frequencies of A, M and R_2 (cDE) than were found in New Guinea natives. Taken as a whole these differences are significant and suggest ethnic differences between the New Guinea and the Bougainville natives. How could these differences have been produced? The physical features clearly indicate that the Bougainville natives are basically Melanesian. It is conceivable that in the original movement of the

Table 7.

Some Gene Frequencies of Melanesian and Polynesian Natives.

	A_1.	B.	M.	S.	R_1.	R_2.
New Guinea (Dunn, Kooptzoff, Price and Walsh, 1956) ..	0·2187	0·1331	0·1667	0·1145	0·9072	0·0657
Bougainville (This series)	0·2541	0·0635	0·2124	0·0874	0·8901	0·1005
Fiji (Walsh and Kooptzoff, 1955) ..	0·2730	0·0815	0·3600	0·0356	0·8050	0·1150
Tongans (Kooptzoff and Walsh, 1957) ..	0·2481	0·0764	0·5931	0·0196	0·7409	0·2062
Maoris (Simmons, Graydon, Semple and Taylor, 1951) ..	0·338	0·0000	0·525	0·062	0·465	0·4862

Melanesians from Asia random drift produced differences such as the above. The blood groups of 1,060 subjects from New Guinea were analyzed according to the administrative district of birth and significant differences were found (Dunn et alii, 1956). In no instance were the same blood group gene frequencies found as in Bougainville. However, examination of the gene frequencies in the various districts of New Guinea showed some evidence of gradients from West to East and East to West, suggesting the possibility of admixture with other groups. Although the addition of a later Asiatic component cannot be overlooked, these gradients make a Polynesian influence seem more likely.

Bougainville is a point of interest in investigating such a Polynesian-Melanesian mixture. It is known that Polynesian canoes have travelled from the Society Islands as far as the Solomons group, but there is no evidence as to the number of these expeditions or as to whether they resulted in the introduction of Polynesian genes into Melanesian islands. Some blood group gene frequencies in Melanesian and Polynesian groups are shown in Table 7, and a selection is plotted on a longitude basis in Figure 3. Gradients place the Bougainville natives between the New Guinea and Fijian natives and the latter are now generally recognised as being a mixture of

Melanesian and Polynesian elements, a fact which is also shown in Figure 3. It does not seem unreasonable, on the basis of this evidence, to conjecture that Polynesian elements are included in the ancestry of the present Bougainville inhabitants. Polynesian physical and cultural characteristics are not evident amongst the present natives but this would not be expected if, as seems likely, the mixture occurred several generations ago.

What is the explanation of the heterogeneity of the blood groups of the Bougainville natives when analysed according to the region of birth and the language spoken? A comparison of the gene frequencies in Tables 5 and 6 with those shown for the

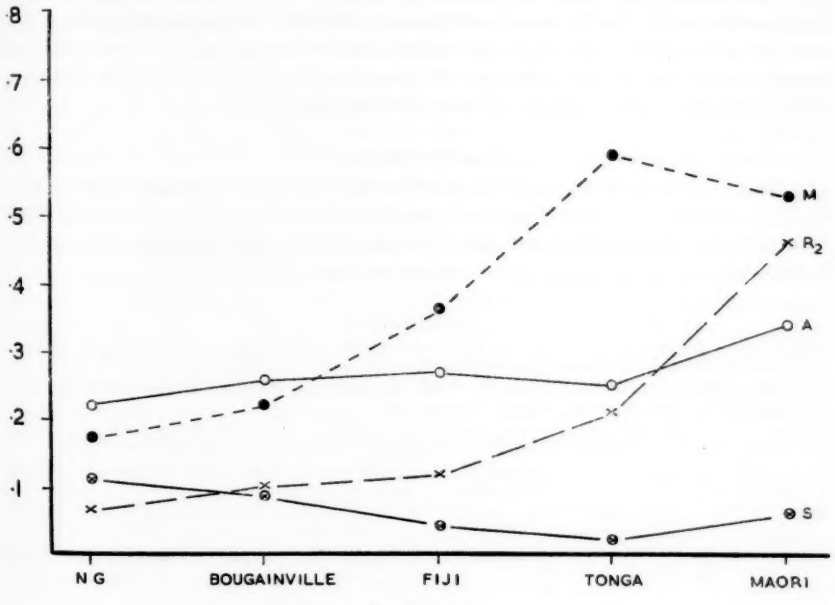

FIGURE III
Some Gene Frequencies of the Pacific Natives.

Tongans and Maoris in Table 7 does not suggest that a varying Polynesian influence has contributed to the differences. It seems more likely that the gene frequencies within the regions are largely the result of random drift. Recently the labour requirements of plantations encouraged migration from different parts of the island, but prior to this there was probably little incentive for the natives to move from the region of their birth, and marriage within the group or adjacent groups was the custom. Furthermore, the different languages are used within defined areas and marriage almost always occurs between people speaking the same language. The observed differences in the gene frequencies therefore probably arose by chance in

the first instance and genetic equilibrium has since been maintained by marriage between people of the same region. More detailed analysis of larger numbers may show gradients in this respect.

Summary

The ABO, Rh and MNS blood groups were determined on 2,858 natives from Bougainville. The results were analysed for the total population tested, for subdivisions based on language spoken and for the administrative subdistrict in which the natives were born. The Kieta subdistrict was further analysed on the basis of arbitrary geographic areas.

The blood group gene frequencies lie between those of the Melanesian New Guinea natives and the Melanesian-Polynesian Fijians. Investigations on language, administrative groups and geographic areas within Kieta showed evidence of heterogeneity of the population, although the heterogeneity within Kieta was restricted to the S system. This is probably due to random genetic drift.

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A LARGE PAPUAN LANGUAGE PHYLUM IN WEST NEW GUINEA

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IN a recent article[1] I have shown or at least made probable that there is a distant genetic relationship between a group of Papuan (non-Austronesian) languages in the Vogelkop peninsula of Netherlands New Guinea and the equally non-Austronesian languages of North Halmahera in East Indonesia. This conclusion was arrived at largely with the help of Morris Swadesh's methods of testing and proving relationships used by him in Amerindian comparative linguistics. These methods are based on the probability calculus specially adapted for the purpose in a formula for calculating the chances of coincidence in a number of corresponding words of, preferably, consonant-vowel-consonant (C.V.C.) complexity in the languages to be compared, found in a test list of 97 non-cultural words.[2]

The Vogelkop languages compared in my paper just mentioned are Moi, Kalabra, Moraid, Madîk, Karôn and Ajamaru. Not included were a number of other languages in that area, described in my: "Voorlopige Resultaten van een Ambtelijk Taalonderzoek in Nieuw-Guinea,"[3] because they were too divergent and would only complicate the main purpose of the comparison. It is the object of the present paper to try and show with the help of Swadesh's test that these languages or at least most of them are, nevertheless, related to the others and thus constitute, together with these, a large group of Vogelkop languages related to North Halmaheran.

The languages in question are those of Amberbaken, Mansibabêr, Mantion, Konda, Jahadian, Kampong Baru and Puragi. They are spoken to the east and south-east of the others and can be divided in a northern, and eastern and a southern group. The northern group is represented by Amberbaken alone, the eastern group consists of Mansibabêr and Mantion, and the southern group includes the remaining four. The latter can be subdivided in two pairs: Konda/Jahadian and Kp. Baru/Puragi. As against these groups Moi, Kalabra, Moraid, Madîk and Karôn form a western group and Ajamaru alone a central, which has, however, special connections with the western group.

Grammatically these languages are, with the exception of Mansibabêr, practically as unknown as the western group. Mansibabêr has a prefixal conjugation

[1] "Prospects of a 'Papuan' comparative linguistics" in *Bijdragen der Koninklijk Instituut voor Taal-, Land en Volkenkunde*, CXIII, 1957.

[2] M. Swadesh, "Perspectives and Problems of Amerindian comparative linguistics," *Linguistics Today*, New York, 1954, pp. 186 sqq. and the older literature cited there. See also note 5 below.

[3] Published by the *Koninklijk Instituut voor Taal-, Land- en Volkenkunde*, The Hague. 1953.

as has Ajamaru.[4] As I have shown in my "Voorlopige Resultaten" there is evidence that the same is the case in all these languages. This fact is in accordance with what is found in N.H.

The vocabularies used for my comparisons are, except for Mansibabêr, ms. lists of varying accuracy in the possession of the Bureau of Native Affairs at Hollandia. For Mansibabêr the vocabulary in Wirz's paper was used. It is very difficult or

impossible to make out the exact phonemes for each language from the written sounds and we shall have to be content with these for the comparison. As it is equally difficult to reconstruct the synophons between any pair of languages we shall have to trust to it that the phonetic ratio of 1/100, that is indeed proposed by Swadesh as a convenient and satisfactory index for more general comparative uses than it was first worked out for, is really on the safe side.[5] As I have argued in my "Prospects"

[4] For Mansibabêr see P. Wirz, "Wörterverzeichnis der Sprache des Stammes Mansibabêr" in *Tijdschrift der Indische Taal-, Land- en Volkenkunde*, Vol. LXII, 1923, pp. 189 sqq. and my "Voorlopige Resultaten." For Ajamaru there is now J. E. Elmberg, "Notes on the Mejbrat people of the Ajamaru district," 1954, (see also my "Prospects").

[5] A *synophon* is a set of corresponding phonemes in two compared languages. The *phonetic ratio* is the proportion of one to the total number of possible C.V.C. complexes in terms of synophons, i.e. $C \times V \times C$ in which C=number of consonantal synophons and V=number of vocalic synophons. It thus roughly indicates the chance of the same meaning being expressed by the same C.V.C. in both languages. To eliminate the possible effects of differences in frequency of the synophons, a correction factor (2/2) is applied to C and V. The fluctuation of chance is taken into account through the formula for calculating the chances of getting a given number of coincidences. See Swadesh, l.c. pp. 199–201. For a more detailed application to Papuan languages see my "Prospects."

it is likely that this is the case at least for the comparison of the western group with N.H. As I did in that paper I add an extra safety margin by holding to the minimum of 4 C.V.C. correspondences as a sound basis for recognizing straight relationships between any two languages, although my vocabularies, with the exception of Mansibabêr, include only 73 of the 97 items of Swadesh's test list for which it was calculated by him. The Mansibabêr vocabulary contains 74 words occurring in the 97 word test list, but because only 62 of the 74 are also found in the ms. vocabularies of the other languages, only these 62 can be used for comparisons with Mansibabêr. Since this is less than 2/3 of the contents of the test list the minimum of 4 C.V.C. agreements would be too much out of proportion and it is, therefore, untenable for the comparisons with Mansibabêr. For these comparisons separate calculation of the number of C.V.C. agreements, required to arrive at the safe limit percentage of chance probability, is necessary. Substituting, then, 62 instead of 97 in Swadesh's formula for calculating the chances of coincidence, but keeping for the reasons mentioned above 1/100 for the phonetic ratio, we find that 3 C.V.C. agreements must be our minimum for comparisons with Mansibabêr.

We shall now first establish the relationships within the eastern and southern groups each, and then try to connect these groups with the others and with each other. For the internal relations within the western group and between this and Ajamaru the reader is referred to my " Prospects."

I. Eastern Group

We find the following acceptable agreements between Mansibabêr and Mantion in the 62 word list used: Msb. *mukuedâ*, Mnt. *mohóra*, " foot "; Msb. *mokfô*, Mnt. *mogwóhi*, " blood "; Msb. *axseid*, Mnt. *ékesi*, " long "; Msb. *ekêni*, Mnt. *áhân*, " red "; Msb. *didîf*, (prefix form *d-*, *t-*), Mnt. *tàni* (poss. pref. *it-*), " I "; Msb. *bubâ* (prefix form *b-*), Mnt. *bàni* (pref. form *b-*, poss. pref. *ab-*), " thou." Two other possible correspondences, Msb. *ervêk*, Mnt. *hwài*, " two," and Msb. *orvômu*, Mnt. *homòi*, " three," must be disregarded as dubious. There remain, then, 6 agreements, 4 of which meet the C.V.C. requirement, though they are really of higher value than that because they are actually V.C.V.C. or C.V.C.V. and higher value complexes. This is so, even if the first two words contain a possessive prefix *m-* as is often the case with names of parts of the body in these languages. Even if we also discount " long " as not convincing the remaining evidence is sufficient. Moreover, among an additional 8 non-cultural words not occurring in Swadesh's 97 word relationship test list but found in his lexicostatistic list,[6] another good C.V.C. agreement is obtained: Msb. *mês*, Mnt. *míhí*, " dog." This makes at least 4 C.V.C. correspondences in 70 words. The relationship between Msb. and Mnt. would be, according to

[6] This so-called lexicostatistic list of 200 non-cultural items is used by Swadesh for measuring the divergence time (time depth) and the degree of relationship of two or more cognate languages; see Swadesh, " Lexicostatistic dating of prehistoric ethnic contacts " in *Proceedings of the American Philosophical Society*, Vol. 96, 1952, p. 456; and the same author in " Archeological and linguistic chronology of Indo-European groups " in *American Anthropologist*, Vol. 55, No. 3, 1953, p. 349.

Swadesh's divergence scale,[7] on the "microphylum" level (nearly 10% agreements). If the two dubious comparisons are included it would be on the "stock" level (nearly 13% agreements).

II. Southern Group

A. Jahadian and Konda: 29 C.V.C. or higher value and 17 C.V. or higher value (C.V.V., V.C.V.) agreements, constituting a relationship on the "family" level (63% agreements). Examples: Jah. *wèhè*, Kon. *wisi*, "head"; Jah. *ronam*, Kon. *runamu*, "tongue"; Jah. *wà*, Kon. *uwa*, "blood"; Jah. *ruati*, Kon. *rioto*, "man"; Jah. *tua*, Kon. *utjua*, *utjia*, "fire"; Jah., Kon. *wi*, "tree"; Jah., Kon. *u*, "egg"; Jah. *à-no* (with 2 p.s. pref.), Kon. *noo*, "drink"; Jah. *wir*, Kon. *weri*, "leaf"; Jah. *noge*, Kon. *nogo*, "big"; Jah. *hobore*, Kon. *soboro*, "good"; Jah. *nènègi*, Kon. *nenggi*, "I"; Jah. *èrègi*, Kon. *egi*, "thou"; et cetera.

B. Kp. Baru and Puragi: 17 C.V.C. or higher value and 6 V.C.V. and C.V. agreements, constituting a relationship on the stock level (31% agreements). Examples: K.B. *kabo*, P. *koibi*, "head"; K.B. *kidabo*, P. *erabu*, "ear"; K.B., P. *imago*, "eye"; K.B. *enuno*, P. *nuni*, "tongue"; K.B. *kemino*, P. *emini*, "tree"; K.B. *uku*, P. *wuko*, "egg"; K.B. *iso*, P. *ito*, "new"; K.B. *onate*, P. *moonada*, "one"; et cetera. It will be noticed that P. *moonada*, "one," as compared with K.B. *onate*, contains the element *mo-* that is in N.H. a morpheme in numerals. This element may, therefore, be regarded as a straight agreement with N.H.

C. A and B: We find the following possible agreements: Jah. *tua*, Kon. *utjua*, *utjia*, P. *kadiwa*, "fire"; Jah. *patio*, Kon. *patjuo*, K.B. *faitu*, "stone"; Jah. *unam*, Kon. *unamu*, P. *amanu*, "tooth"; Kon. *sokuru*, K.B. *otatakoro*, "neck"; Jah. *mènègi*, Kon. *nenggi*, K.B. *neri*, P. *nei*, *nedi*, "I"; Jah. *oriège*, Kon. *oruege*, P. *aruē*, "three"; Jah. *wà*, Kon. *uwa*, P. *apaă*, "blood"; Jah., Kon. *u*, K.B. *uku*, P. *wuko*, "egg"; Jah. *èrègi*, Kon. *egi*, K.B. *eri*, P. *edi*, "thou"; Jah., Kon. *pa*, P. *aiba*, "mouth"; Jah. *à-mo*, Kon. *imo-ro*, K.B. *ma-we*, P. *ma-weira*, "come" (Jah. with 2 p.s. pref., the others with imperat. particle). This makes 5 possible C.V.C. or higher value and 5 C.V. or higher value agreements. Of these, however, one C.V.V.C. agreement, viz. "stone," may be an Austronesian loanword (Aun. *watu*, *batu*) and therefore cannot count. On the other hand one of the V.C.V. correspondences ("blood") can be regarded as a V.C.V.C. because comparison with Amberbaken (see inder V hereafter) shows that an original final *r* has been lost. But even without this, there remain 5 C.V.C. or higher value correspondences, 4 of which between Jah., Kon. and P. alone, sufficient to indicate a relationship which would be between the microphylum and stock level (just over 12% agreements). Moreover, if it is thought necessary, confirmation of the relationship with K.B. too can be obtained by "chain procedure" and/or by "intersection" (see under V hereafter for these methods).

[7] Cf. preceding note. For the divergence scale see Swadesh "Perspectives and Problems," p. 206.

III. Western Group and Amberbaken (Northern)

There are the following possible C.V.C. or equal/higher value agreements: Karôn, Madîk *bofuf*, Amb. *sabup*, "ashes"; Kalabra *mohot*, Moraid *mahat*, Karôn, Madîk *mek*, Amb. *mè*, "five"; Kalabra *mejanin*, Moi. *nin*, Karôn, Madîk *nan*, Amb. *nan*, "thou"; Karôn *m-ungguwèn* (with poss. prefix), Amb. *i-wanggen* (with poss. pref.), "nose"; Kalabra *ton*, Moraid *tolg*, Moi *toon*, Amb. *tom*, "star"; Kalabra *fehen*, Moi *weem*, Amb. *ibem*, "red." This makes 6 C.V.C. agreements, 4 of which are with Kalabra and 4 with Karôn, sufficient to indicate relationship. Even if we disregard "ashes" as doubtful, there remain 5 C.V.C. correspondences, of which 4 are with Kalabra—though only 3 with Karôn—which is also sufficient to link Amberbaken up with the western group. If one so wishes, moreover, a link-up with Karôn too is possible by the "intersection" method or by "chain procedure."

IV. Western and Southern Groups

There are the following acceptable correspondences: Kal. *weko*, Mor. *begu*, K.B. *uku*, P. *wuko*, Jah., Kon. *u*, "egg"; Kar. *knabe*, Mad. *kanagé*, K.B. *kidabo*, P. *erabu*, "ear"; Kar. *nanggit-su*, Mad. *naingit*, K.B. *ningge*, P. *ningg-eira*, "eat" (Kar. and P. with imperat. part., Kar. and Mad. also with 2 p.s. pref. ?); Moi *makuru*, Kon. *sokuru*, "neck"; Moi *dewe*, K.B. *tefe*, Mad. *kamteri* (cf. Kar. *Kam*, "sun"), Mor. *telu*, Kal. *til*, Jah. *ti*, Kon. *tji*, "sun"; Kar. *sjur*, Mad. *sjul*, K.B. *saû*, "water"; Kar. *ma-su*, Mad. *na-ma*, Jah. *à-mo*, Kon. *imo-ro*, K.B. *ma-we*, P. *ma-weira*, "come" (Kar., Kon., K.B. and P. with imperat. part., Mad. and Jah. with 2 p.s. pref.); Kal. *na*, Jah. *à-no*, Kon. *noo*, "drink" (Jah. with 2 p.s. pref.); Kar. *gò*, Mad. *gwo*, Jah. *guhu*, Kon. *gusu*, "feather"; Kar. Mad. *ku*, K.B. *fuko*, "meat"; Kar. *kuwè*, Mad. *kui*, Jah., Kon. *wi*, "tree." The last word may be an Aun. loan-word. (Aun. *kayu*.) Discounting this, there remain 6 C.V.C. or equal/higher value and 4 C.V. agreements. Of the C.V.C. correspondences 4 are between Madîk and Kp. Baru alone, sufficient to recognize the connection between the two groups. Here too chain connection and intersection will, if necessary, supply the link with the other individual members of the groups. Moreover, among an additional 8 non-cultural words not occurring in Swadesh's relationship test list, but found in his lexicostatistic list another high value (C.V.C.V.C.) correspondence is obtained, viz. Kal. *kalen*, Mor. *kelé*, Moi *kelem*, K.B. *karino*, P. *kanini*, "bird." This makes the total of corresponding C.V.C. or higher value complexes in the two groups 7 in 81 words; 4 of them between Mad. and K.B. and three between Kal./Mor. and K.B.

V. Amberbaken and Southern Group

There are only three acceptable C.V.C. or higher value agreements and 2 C.V./V.C., viz. Amb. *efàr*, Jah. *wà*, Kon. *uwa*, P. *apaä*, "blood"; Amb. *ang-guret*, K.B. *kure-we*, P. *ure-weira*, "drink" (Amb. with 2 p.s. pref., K.B. and P. with imperat. part.); Amb. *kum*, P. *kukumbi*, "smoke"; Amb. *in*, Jah. *nènègi*, Kon. *nenggi*, K.B. *neri*, P. *nei*, *nedi*, "I"; Amb. *tu*, Jah. *mutu*, Kon. *mutju*, "one." Although one of the correspondences ("drink") is really a C.V.C.V. complex that can even be regarded as a C.V.C.V.C. (cf. for the final consonant Kar. *nanggit*, Mad. *naingit*=K.B. *ningge*, P.

ninggeira, "eat"), the evidence is hardly sufficient by itself to base a connection upon. However, it confirms the chain connection that can be constructed between Amberbaken and the southern group *via* the western group (see under III and IV above).[8] It can also be confirmed by applying the "intersection" method, i.e. by calculating the convergence of chance as between one language and two or more others.[9] Thus Amb. has 4 C.V.C. agreements with Kalabra of the western group (see under III above) and 3 C.V.C. agreements with Puragi of the southern group. Since the chance probability for 3 C.V.C. correspondences (among 97 words and with a phonetic ratio of 1/100 as retained by us!) is, according to Swadesh's formula, 5·8%, and for 4 C.V.C. correspondences 1·4%, the chance probability as between Amberbaken on the one and Kalabra and Puragi on the other side is, according to the intersection method, the product of the two percentages doubled, or only ca. 0·16%.

VI. Western and Eastern Groups

We find 4 possible C.V.C./C.C.V. or higher value and 4 C.V. correspondences, viz. Moi *wawit*, Mnt. *bit*, "eat"; Kar. *go*, Mad. *gwo*, Mnt. *mougwu*, "hair, feather"; Kal. *kadiabu*, Mnt. *kariaho*, "sand"; Kal. *ton*, Mor. *tolg*, Msb. *motur*, "star"; Moi *na-ni-matu*, Mnt. *bi-ni*, "come" (Moi with 2 p.s. pref. and imperat. part., Mnt. with 2 p.s. pref.); Kal. *bí*, Mor. *bet*, Msb. *mebi*, "earth"; Kal., Mor. *tit*, Kar. *tat*, Mad. *djí*, Msb. *didîf* (pref. *d-*, *t-*); Mnt. *tàni*, "I"; Kar., Mad. *ku*, Mnt. *móku*, "meat." However, some of the C.V.C. agreements are doubtful as such, because Mnt. *bit*, "eat," may contain the 2 p.s. prefix *b-* and the comparison Mor. *tolg*: Msb. *motur* may appear questionable. Moreover, the agreements are very much scattered over the different languages. There is—apart from 1 p.s. pronoum—one possible straight agreement between Mnt. and N.H., viz. Mnt. *ókóru*, "black," cf. Tobelo *kokotu*, "id.", which is a C.V.C.V. complex. But there is no support for it elsewhere in the vocabulary. The evidence, then, is weak, nor can a relationship be very well constructed by means of chain procedure or intersection, because for the former method there is no other language or group of languages to form the link (see under VII, VIII and IX hereafter), and for the latter the agreements between west and east, apart from being partly questionable, are too much divided over different languages. We must, therefore, leave a connection between these two groups as without sufficient foundation.

VII. Eastern and Southern Groups

We find only the following possibilities: Mnt. *moku*, K.B. *fuko*, "meat"; Mnt. *mougwu*, Jah. *guhu*, Kon. *gusu*, "feather"; Msb. *ervêk*, Jah., Kon. *irege*, "two"; Msb. *orvômu*, Jah. *oriege*, Kon. *oruege*, "three." Even apart from the fact that some of these may appear questionable, the evidence is insufficient because there is at the best only one possible C.V.C. correspondence among them. Nor is it possible to seek confirmation by chain procedure because, although the southern

[8] For this "chain procedure" see Swadesh, o.c., p. 202 and the literature mentioned there.
[9] Swadesh, o.c., p. 203.

group has been connected with western (see IV) and, by chain procedure and/or intersection with Amberbaken (see V), neither of these could be connected with the eastern group. Proof by intersection is equally impracticable for similar reasons as for the western and eastern groups (see VI). We must, therefore, leave a relation between these groups as unproven.

VIII. Eastern Group and Amberbaken

Between these groups I cannot even find one acceptable correspondence, C.V.C. or other, nor is, of course, a chain connection or intersection possible.

IX. Eastern Group and Ajamaru (Central)

There are only two possible agreements, one of which is a possible, though uncertain, C.V.C., viz. Msb. *ervêk* (Mnt. *hwài* ?), Aj. *ewok*, "two"; the other agreement is Msb. *didif* (pref. *d-*, *t-*), Mnt. *tàni* (poss. pref. *it-*), Aj. *tio*, *djio* (pref. *t-*), "I." This evidence is too weak even for applying the intersection method with any language of the western group with which Ajamaru is connected.

The result of our comparisons, then, is that at least a very large part of the Vogelkop belongs to one linguistic grouping which we will call the West Papuan phylum,[10] and which includes, as follows from their relation with the western group and Ajamaru, as shown in my "Prospects," the non-Austronesian languages of North Halmahera.

Only two of the languages dealt with, viz. Msb. and Mnt. in the east of the peninsula, cannot be shown to belong to the same phylum, although certain points seem to indicate that such a possibility must not, on the other hand, be excluded once for all. Apart from a few possibly cognate words as dealt with above, and apart from certain grammatical features as a prefixal conjugation, there are such pronouns as the 1st p.sg., the 3rd p.sg. and the 1st p.p. in Msb. comparable with some in the western group, Ajamaru and N.H. The likenesses are not striking but there may be more in it than is immediately apparent.

The different groups of this phylum may be roughly characterised by the forms of the 1st and 2nd p.sg. pronouns, occurring as items in Swadesh's test list. In the western group, together with Ajamaru and N.H., these pronouns contain the elements *t* and *n* respectively, in Amberbaken they both contain *n*, in the southern group they are *n* and *e* (*a*) respectively and in the eastern group, if it must be included, they are *t* and *b*. Amberbaken, therefore, is intermediate between western and southern group in that it shares in the 2nd p.sg. with the western but the 1st with the southern group. The eastern group shares the 1st p.sg. with the western.

One language or group of dialects of the Vogelkop area, the Windesi-Wandamen language, does certainly *not* belong to this West Papuan phylum, but is Austronesian (Melanesian II). It is spoken in the extreme south-east of the peninsula (see map). The same applies, of course, for the language of the Biak-Numfor immigrants along

[10] Americanists often distinguish linguistic "stocks" and "phyla" from linguistic "families" according to the degree of relationship. These terms can be used very well in Papuan linguistics also.

[11] See my "Notes on Windesi Grammar," *Oceania*, Vol. XXVI, No. 1, 1955.

the north-east coast of the Vogelkop. On the other hand there must almost certainly be other Papuan languages in this area, that may belong to this phylum).[12]

The question arises whether this West Papuan phylum has no extensions outside the Vogelkop peninsula other than the eastern part of Salawati island facing it and N.H. To the south of the Vogelkop, across the McCluer Gulf in the Bomberai peninsula, this is probably not the case. As I have shown in my "Voorlopige Resultaten" the Papuan languages spoken there are of a very different type, viz. with a suffixal conjugation.

A different matter may well be the areas east of the Vogelkop, particularly the Geelvink Bay region. Very little is known about the non-Austronesian languages there. Concerning one language, that of Mantembu in central Yapen island, that shows non-Austronesian characteristics, notably in vocabulary and syntax, I have in my "Voorlopige Resultaten" suggested the possibility that it might prove to have some distant connection with the Vogelkop languages dealt with above. It has, for example, a prefixal conjugation and some of the personal pronouns show likenesses to those in the Vogelkop phylum. But the general vocabulary yields little that can be used for anything like a reasonable comparison. One notable exception is Mantembu *oram*, "stone," if compared with Jahadian (s. group) *òram*, "mountain." Since Konda, which is so closely related to Jah., uses one word *patjuo* both for "stone" and "mountain" (cf. also Kp. Baru *faitu*, "stone," *faitiko*, "mountain"; Puragi *paito*, "mountain"; but in Jah. itself: *patio*, "stone"; possibly an Aun. loanword from *watu*, *batu*), it is by no means impossible that we have here a straight agreement between Mantembu and Jahadian. However, the example is almost too good to be true and, isolated as it is, it has little value.

Although, therefore, there are certain possibilities, nothing can be said with certainty about a further extension eastward of our West Papuan phylum.

H. K. J. Cowan.

[12] Thus for example the Arfak and Hattam languages for which a very short list of words is given by A. B. Meyer in "Die Papuasprachen in Niederländisch Neu-Guinea," *Globus*, 94.

REVIEWS

Bibliography of West New Guinea. By K. W. Galis. Yale University South-east Asia Studies. Bibliography Series, 1956. Pp. v+135 (mimeographed).

A book embodying all available scientific information on Western New Guinea is welcome. This volume is a translation of a bibliography published in mimeographed form by Dr. Galis in Dutch, in 1955. It provides coverage of its subject by alphabetic arrangement under author names, but as there is an unusually large amount of material in this area published anonymously, such has been given a special heading "anonymous" and arranged by year of publication from "before 1900" to "1951—". The coverage of the various sciences appears to be adequate and the reproduction is good. Perhaps in the "key to periodicals cited" more detail concerning the periodicals themselves might have been given. An appendix on pp. 134–135 contains a list of publications by South-east Asia Studies, Yale University, not limited to New Guinea. This will be a very handy reference volume for students in many fields.

A. CAPELL.

Bibliography of Oceanic Linguistics. Compiled by H. R. Klieneberger. London Oriental Bibliographies Volume 1, Oxford University Press, 1957. Pp. vii+143. Australian price 73s.

This is a book that has serious limitations and drawbacks. Although professing to be a "bibliography", it is limited to *printed* books and articles. In view of the large quantity of material that is being produced now in cyclostyled form, and which will probably never appear in "print", this seems a very arbitrary limitation. In spite of this, the Anthropos Bibliothek microfilms have been included, yet at the same time those issued by the South Pacific Commission have been either excluded or overlooked.

Further, there are considerable numbers of omissions even among printed books and articles. A list of such omissions has been prepared at the Australian National University at Canberra, and includes such a work as John F. Mayer's *Gedaged-English Dictionary*, perhaps on the ground that it is lithographed, even though cloth-bound like other books. The objection does not apply to C. E. Fox's *Nggela Dictionary*, published in Auckland, N.Z. in 1955: this at least is a printed book. The reviewer's Doctorate thesis appears in item 637 as "typescript (1938)". The compiler is apparently unaware that it was published in Sydney in 1943 as a book!

Vernacular books are very inadequately accounted for. A few are given a place, but the majority of school readers and suchlike, and translations into vernaculars of such books as "The Pilgrim's Progress" are not usually included. Biblical translations very often provide the only available texts in Oceanic laguages, but these are very rarely noticed. The same remarks apply to vernacular newspapers which appear in some parts of the Pacific.

There are factual errors in some of the entries, e.g. 823 *Tegua* language of Torres Islands is assigned to the Torres Straits, and 828, The Toga language of the Torres

Islands is similarly assigned to the Straits. No. 827, Wirz's " Sprache von Central Neu-Guinea " is placed under Australian instead of Dutch New Guinea. No. 894, Medlpa of Mount Hagen is said to be " Papuan, Melanesian influenced ". Where that idea could have come from is hard to imagine. There is, of course, no Melanesian in Central New Guinea.

The book is excellently produced, well indexed, and has obviously been very carefully prepared. It is the sort of book that ought to advance beyond a first edition, and it is in the hope that this will be so that this rather detailed list of blemishes has been given. Even as it stands, there is an immense amount of useful information in the volume, which every worker in the Oceanic field will need.

A. CAPELL.

Un Siècle et Demi de Contacts Culturels à Tanna, Nouvelles Hébrides. By Jean Guiart. Paris: Publications de la Société des Océanistes, No. 5. 1956.

The island of Tanna has the largest native population of any of the New Hebrides. Culturally it had a rather poor reputation, but it has been of considerable interest in recent years by reason of the John Frum movement. M. Guiart wrote on this last subject in *Oceania*, Vol. XXII, No. 3, and this present book is an extension of that study and a fuller documentation of it. The work falls into two main sections: a cultural study of Tanna at the present day, from an almost purely anthropological viewpoint (pp. 7–107) and a historical study of the " century and a half of evolution " (pp. 117–222). The earlier time is then picked up, a further study of Tanna mythology with special reference to John Frum, and the ancestor cult is viewed from the same angle.

The main theme may be summed up as the latent force of old beliefs and customs, lost to surface view, but ready to burst out into new power when an appropriate stimulus is supplied. The post-war years had provided so many instances of such occurrences that it is not hard to believe in the truth of the thesis. Even Mr. Humphreys, in *The Southern New Hebrides* (1923), accepted the thesis that the old culture of Tanna was lost and could only be glimpsed in the general writings of former missionaries. M. Guiart, however, found that old beliefs were still perfectly clear and old social orders still active, and above all that Christianity had a much weaker grip on the hearts of the people than was believed. Indeed, the revelation is amazing of how little of the essence of Christianity has really been grasped after 100 years—so easily was it all discarded at the call of the Messiah John Frum. " The appearance in broad daylight of the John Frum messianism astonished everybody, missionaries, administrators and traders (p. 255)."

In his *Social Anthropology in Melanesia* (p. 131), Professor Elkin stated: " In these days of ferment in native thought, Tanna is a most suitable place for research, so that real psychological and sociological light might be thrown on the process." M. Guiart goes a long way towards fulfilling this desire. He has been able to trace a large part of the old social organization—kinship system, political system, tribal groupings, *kava* drinking, the rôle of dancing (officially forbidden by the Missions) and much of the old religious life. An excellent series of maps is provided, some in the body of the book, and two on a large scale, folded into the end, but on the first of the folding maps " District of Green Hall " on the extreme north should be " District of Green Hill ".

Why is it that since C. B. Humphreys' day the old culture has been regarded as lost, when such appears not to be the case? M. Guiart speaks of the distrust he met initially, dispelled only by his own willingness to join in the ceremonies and not to

report them to Government or Missions. The present book is a study not only of the old culture of Tanna, but also of the effects of the attitude taken right from the beginning by the missionary workers on the island. The condemned ways " went underground ", and a large part of M. Guiart's work is a study of the conditions which brought them to the surface again. He has much to say in criticism of the Missions. Some of it is certainly not justified, but it would certainly be profitable for missionary workers not only in the New Hebrides but in many other places to read and weigh what is said in the course of the book.

After the study of what Guiart calls " Sociologie Traditionnelle " (up to page 116), the larger part of the book is taken up with Guiart's second subject, *Un Siècle et Demi D'Evolution*—the history of Tanna since the coming of the European. Here the author has gone to a great deal of trouble to study every available document, and he is able to quote chapter and verse for all the statements that he makes, up to the year 1952. The myth of John Frum is the point of central interest in the story : the history serves to lead up to the movement, and following chapters analyse the John Frum myth and the cult of the ancestors, into which it is woven. His summary may be quoted (p. 259) : " The myth of John Frum has crystallized a situation marked by a constantly increasing disequilibrium between the will to power and the isolation of the Melanesian people, and the irritating weight of an administrative and missionary paternalism. It has for the moment at least, allowed a solution fluctuating because renewed from moment to moment, yet marking a positive progress in the struggle of ' Man Tanna ' against an authority that weighs him down." He points out the necessity for a radical change of method of government. Many feel that the entire system of condominium is at fault, and that no real progress is likely to be made in the New Hebrides while this system remains. This conclusion, however, is not envisaged by Guiart in this book, but after reading the book, this reviewer at least feels more definitely than ever that such a course is imperative.

Somewhat less than a third of the last part of the book is occupied by a sociological inventory of Tanna, village by village. This is the most detailed, if not the only, study of its kind made in the New Hebrides, and incidentally contains many items of anthropological fact which could not be included in the body of the book. It is rounded off by quotations from a number of the documents referred to in the historical section (in English) and a very excellent bibliography occupying nine pages. A set of plates shows ceremonial life. The whole work is a rich contribution to a field which did not seem to have a future, and suggests that there may be possibilities even yet for other parts of the southern New Hebrides.

A. CAPELL.

Fijian Grammar. By G. B. Milner. Government Press, Suva, Fiji, 1956. Pp 150. Price 10s. (Fijian).

This book undoubtedly gives the fullest account of the Standard Fijian Language which has yet appeared. It is the first textbook of the language produced by a scholar trained in modern linguistic methods. In addition to being a grammatical analysis of the language, the book is provided with a set of 17 exercises and 4 texts, the keys to which are given for the student who is studying alone.

The author does well to provide (Appendix A) a glossary of the special grammatical terms he uses, for some of these will not be known to the average non-specialist student. He begins with a study of phonetics and phonemics, and follows this by the sections on morphology, which occupy the bulk of the book. There is no separate account of syntax, apart from notes in Lessons 3 and 4, which introduce the student

to sentence types of various kinds, whose details are subsequently enlarged in the morphology.

The section on phonetics introduces the untrained student to the spoken language in an understanding manner and the matter is well graded for practical use. A study of intonation occupies Appendix C, and this is an important innovation, for apart from a study by N. Scott in the *Bulletin of the School of Oriental and African Studies*, 1948, pp. 737–753, nothing has been published on this subject, which is so important for a student whose aim is to appear as much like a native as possible. Lessons 5 to 21 then carry on the study of Fijian morphology in a well graded series, each complete with exercises, idioms and vocabulary. The important and at times tricky subject of Fijian word order is dealt with progressively, first in Lesson 4 and then in other lessons as individual points occur. Appendix B deals with terms of kinship in Bau Fijian.

The book is well printed on art paper. Its size ($7\frac{1}{2}'' \times 10''$) is perhaps a little against it : it needs a table, not a pocket or even a knee ! Its scope and the thoroughness of treatment should make it a very useful handbook to the student who wishes to take the language seriously, and its price is certainly unusually low.

A. CAPELL.

Yulengor : Nomads of Arnhem Land. By Wilbur S. Chaseling. With Introduction by A. P. Elkin. Pp. i-xxvi, 1–173. With Plates. Published by the Epworth Press, London. 1957. Price in England, 21/–.

The Reverend W. S. Chaseling and his wife called on me early in 1934 on their way to start a Methodist Mission amongst the Aborigines at Yirrkala in north-eastern Arnhem Land. They remained at their post until 1941, and a few years later showed me an early draft of this book, with the request that I might write an introduction. This I did, and forgot all about it until I recently received a copy of the book.

Yulengor is not a scientific treatise, but it provides first-hand information which all of us, scientists and the general public, want to know. Mr. Chaseling was a good observer and questioner, and obviously did know his people. After all, he lived very close to them. Moreover, he respected their way of life, even while he knew it would eventually change and that he would help it to do so. His missionary approach, as reflected in this book, was very enlightened, and for that reason alone the book is to be commended.

Since I wrote the Introduction, much anthropological research has been carried out in this region, and in addition to reference to W. L. Warner's *A Black Civilization*, reference should now be added to R. M. Berndt's *Djanggawul*, the same writer's *Kunapipi*, and to *Art in Arnhem Land*, by A. P. Elkin and R. M. and C. H. Berndt.

It is a pity that Mr. Chaseling did not adopt a simple phonetic spelling for native words, for the attempt " to give ordinary English letter values " is never very happy. Even didjery-doo for the usual didjeridoo seems strange. But readers familiar with the literature of the region will recognize the words (even Junkgowa for Djanggawul, and Yulengor for *Julnɔ* or *Yulnɔ*), and others will not be inconvenienced. Perhaps, too, it would have been better to have left the tribal Ancestress as such and not referred to her as a Goddess (p. 126) ; and certainly the last sentence of paragraph 2 on p. 73 should be omitted. After all, marriage with mother's brother's daughter is cross-cousin marriage.

Mr. Chaseling's book is a sound and personal introduction to the way of life, psychology and beliefs of the Aborigines of north-east Arnhem Land.

A. P. ELKIN.

An Illustrated Ethnography of Formosan Aborigines: The Yami. Volume I. By Tadao Kano and Kokichi Segawa. The Maruzen Company, Tokyo, 1956. Pp. 468. Price $10.

This is a revised and enlarged version of a novel work previously published in 1945 most of the copies of which, however, were destroyed by air-raids during the war. Its reappearance has created some excitement among anthropologists. The work consists of several hundred photographs, sketches and diagrams depicting the way of life of the little known Yami of Botel Tobago Island off Southern Formosa, and is the result of several field trips made by the authors between 1927 and 1935.

The fields covered by the photographs include physical features of the Yami, habitations, clothing and adornment, agriculture, fishing and fishing gear, preparation of foodstuffs, boats and boat building, arts and crafts, and family life. Each photograph is captioned and a legend appears on almost every page to tie the photographs together. Of all the excellent photographs the series on the festival of the millet harvest and the launching of the new boats are, to say the least, spectacular. A short, very readable introduction on the ethnography of the Yami is included. The Maruzen Company is to be congratulated on this beautiful publication.

J. H. Bell.

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